REVIEW OF ENVIRONMENTAL FACTORS (REF)
BEACH RD STOCKPILE DEPOT
STAGE 2

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Document control

Item	Details
Project	Review of Environmental Factors – Beach Rd Stockpile Depot – Stage 2
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Prepared By	City Services, Shoalhaven City Council

Document status

Version	Author / Reviewer*	Name	Signed	Date
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	Reviewer	Geoff Young		24/01/2024

*Review and endorsement statement:

"I certify that I have reviewed and endorsed the contents of this REF document and, to the best of my knowledge, it is in accordance with the EP&A Act, the EP&A Regulation and the Guidelines approved under clause 170 of the EP&A Regulation, and the information it contains is neither false nor misleading".

Assessment and approvals overview

Item	Details
Assessment type	Division 5.1 (EP&A Act) - Review of Environmental Factors (REF)
Proponent	Shoalhaven City Council
Determining authority / authorities	Shoalhaven City Council
Required approvals (consents, licences and permits)	Nil
Required publication	Yes: this REF must be published on the determining authority's (Council's) website or the NSW planning portal, in accordance with clause 171(4) EP&A Regulation 2021 and the guidelines published under cl.170, as being a matter of public interest.

1. PROPOSAL AND LOCATION

1.1 Proposed activity

The proposal involves the establishment and operation of a 2.7 ha (approx.) stockpile depot site ("Beach Rd Stockpile Depot") to support operations associated with Shoalhaven City Council (SCC) construction and maintenance activities.

Beach Rd Stockpile Depot would enable the temporary storage of construction materials and components, in addition to the storage, testing, sorting and reuse of construction and maintenance waste material in accordance with relevant NSW Environmental Protection Agency (EPA) Resource Recovery Exemptions (RRE's) made under the *Protection of Environment Operations (Waste) Regulation 2014*.

Stage 1 of Beach Rd Stockpile Depot has been established within an existing, highly disturbed area (Area A) and a moderately disturbed area (Area B) of the subject site (refer to Figure 1), under provisions of the *State Environmental Planning Proposal (Transport and Infrastructure) 2021*. A Review of Environmental Factors (REF) was prepared for this purpose (Bryant 2022).

Stage 2 of Beach Rd Stockpile Depot (the subject of the current proposal and assessment) would involve the expansion of the stockpile depot over a historically disturbed area of the subject site to maximise the footprint and functionality of the stockpile depot, providing for approximately 2.5 ha of useable space (refer to Figure 1) for stockpile depot activities, while retaining and protecting sensitive environmental qualities and higher integrity vegetation of the site, and minimising impacts on the aesthetic values of the locality.

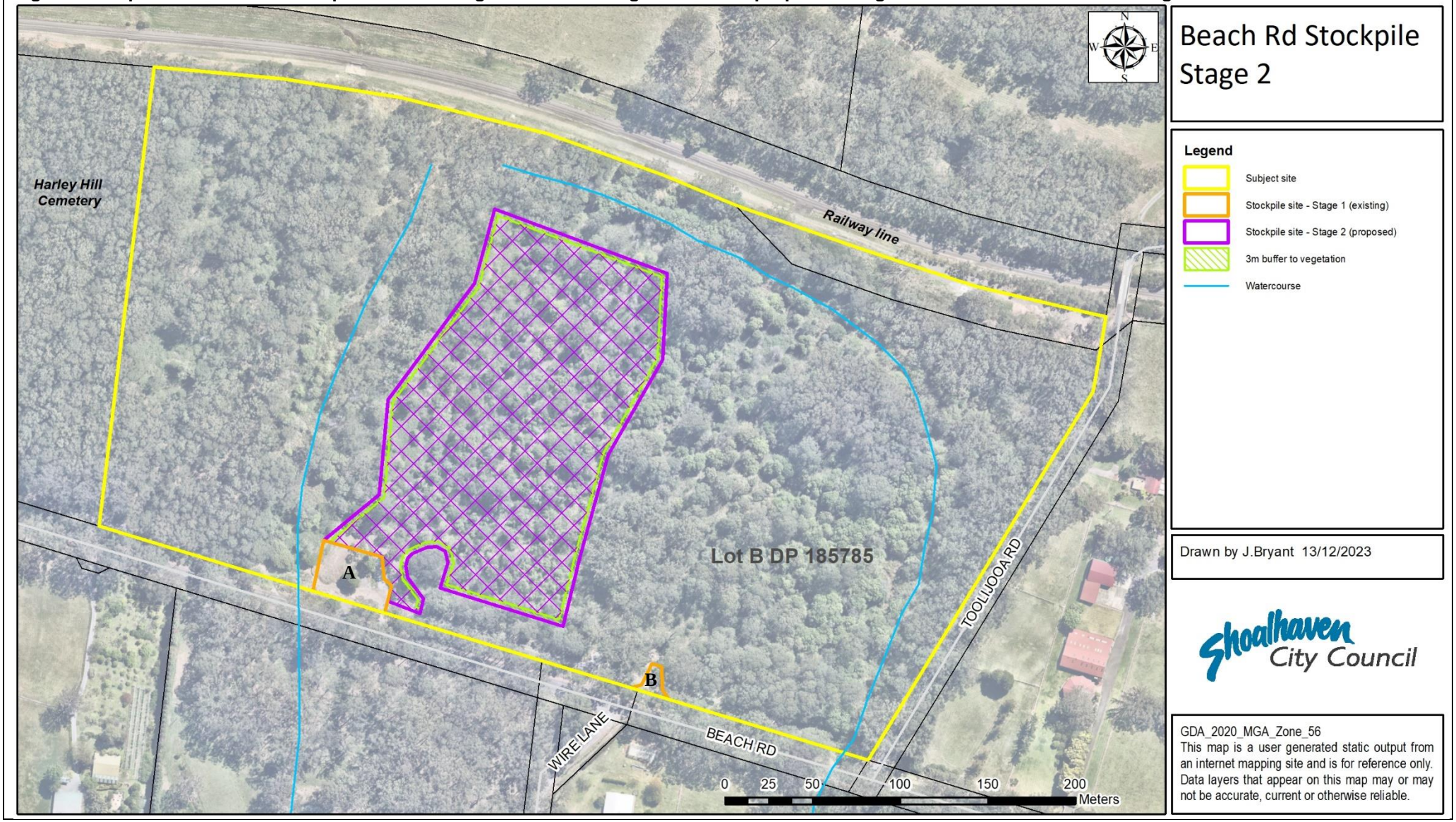
The proposal would involve:

- Clearing 2.58 ha of low-quality vegetation (staged and in accordance with a Soil and Water Management Plan – SWMP – to minimise erosion risks).
- Establishment of 3.0 m buffers to surrounding vegetation (including sediment controls and seeding with low, native groundcovers).
- Levelling and stabilisation of stockpile areas.
- Construction of stabilised internal access roads.
- Construction of internal drainage with filtration, energy dissipation and a sediment basin.
- Construction / installation of storage sheds.
- Establishment and / or enhancement of vegetation screens.
- Operation of the Beach Rd Stockpile Depot (in accordance with a management plan) for the temporary storage of construction materials and components; and the temporary storage, sorting, testing and treatment of waste materials for reuse in accordance with relevant NSW EPA Resource Recovery Exemptions (RRE's), or where appropriate, disposal at a licenced facility.

Figure 1 (below) shows the subject site with the established Stage 1 area and proposed Stage 2 area with 3.0 m buffer to vegetation.

Shoalhaven City Council (SCC) is the proponent and the determining authority under Part 5 of the EP&A Act. The environmental assessment of the proposed activity and associated environmental impacts has been undertaken in the context of Clause 171 of the *Environmental Planning and Assessment Regulation 2021*. In doing so, this Review of Environmental Factors (REF) helps to fulfil the requirements of Section 5.5 of the Act that SCC examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

Figure 1. Proposed Beach Rd Stockpile Site showing established Stage 1 area and proposed Stage 2 area with 3.0 m buffer to vegetation



1.2 Location

The subject land is Lot B DP 185785, Beach Rd, Berry. Lot B is an undeveloped freehold lot, owned by Shoalhaven City Council and classified as Operational Land under the NSW *Local Government Act 1993*.

Lot B DP 185785 is bounded by Beach Rd along the southern boundary, a railway line along the northern boundary, an undeveloped section of Toolijooa Rd and adjacent rural residential land to the east, and Council owned Community Land (Lot 1 DP 723973) containing the historic Harley Hill Cemetery to the west.

Details of affected land are provided in Table 1.

Figures 2 and 3 show the subject site location and the local context with cadastral information, respectively.

Table 1. Property affected by the proposal

Lot / DP	Description	Land owner / manager	Other pertinent information
Lot B DP 185785	Beach Rd Stockpile Depot	Shoalhaven City Council	Freehold Operational Land

Figure 2. Subject site location

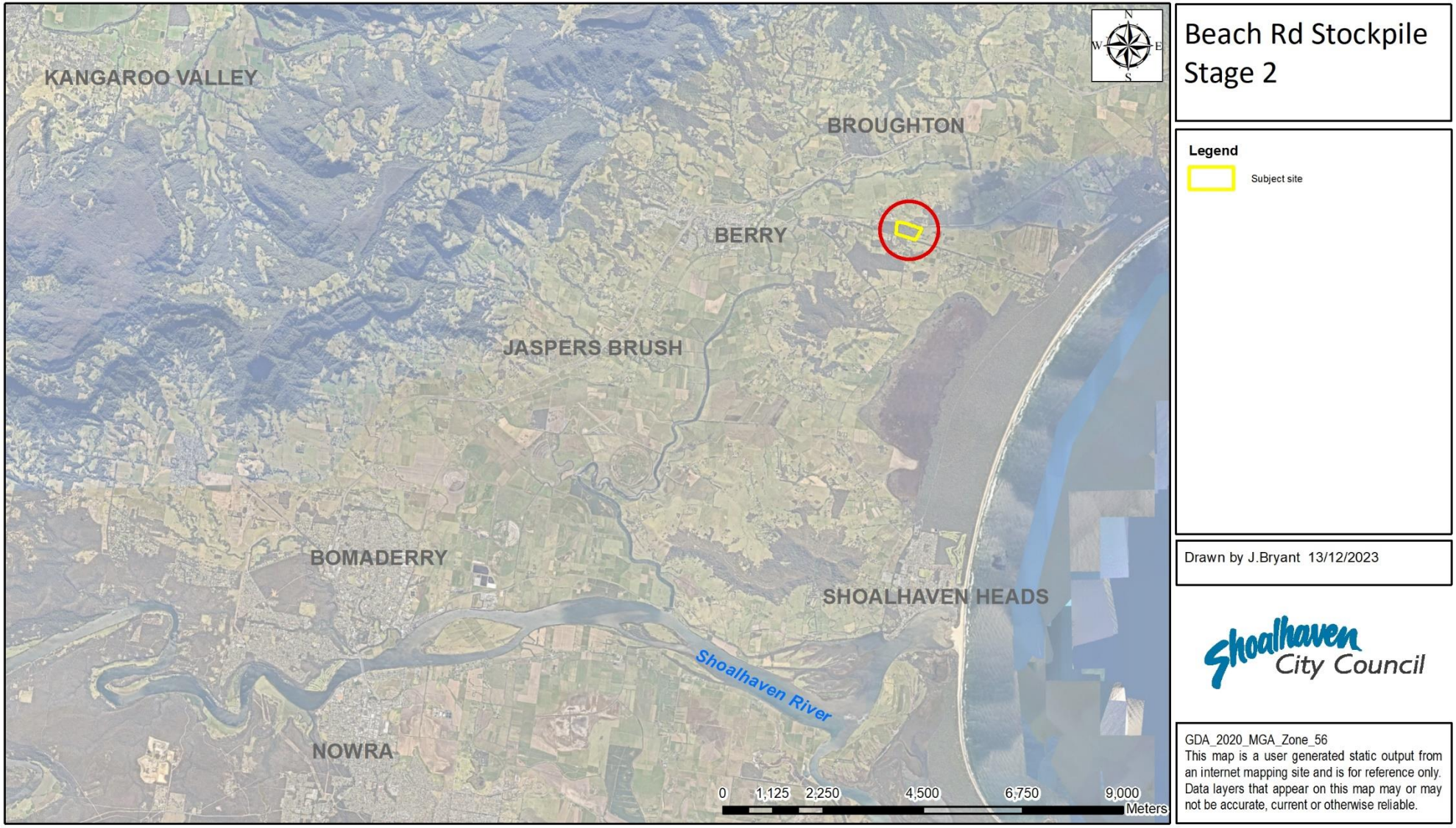
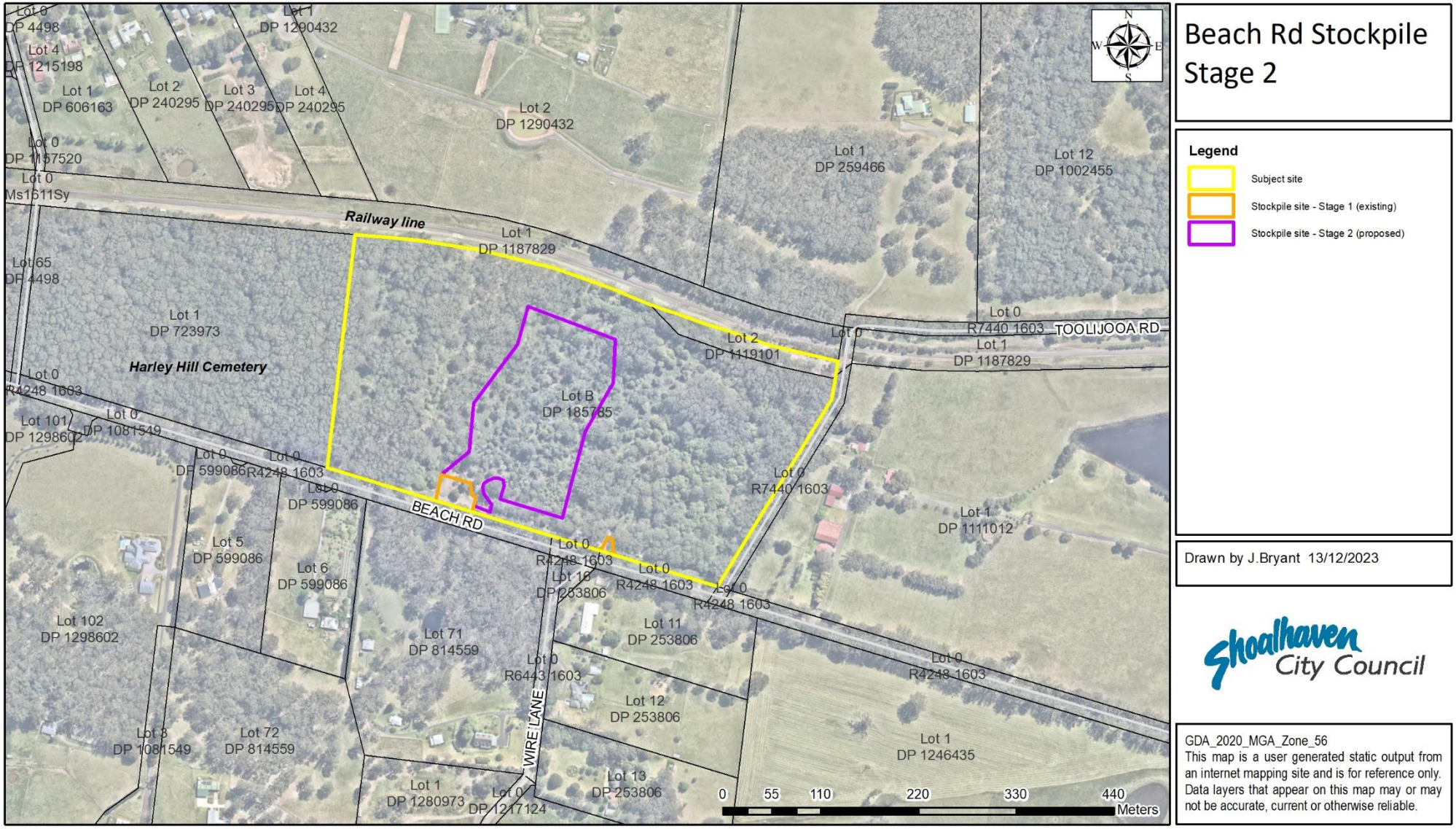


Figure 3. Subject site with cadastral information



1.3 Background and justification of proposal

Currently, Council's Northern Maintenance District has no established, suitable stockpile area to store and test material for reuse. This situation often necessitates the disposal of waste material to landfill at cost and the loss of material which could potentially be reused on other projects.

The Beach Rd Stockpile Depot would facilitate improved practice and greater sustainability in waste management and resource recovery associated with construction and maintenance activities.

The subject site and adjacent land have been used historically for uncontrolled stockpiling of material associated with road maintenance activities, as evidenced by piled soil, subbase and pavement material. This use has involved practices considered inappropriate by current standards, including in some locations, the dumping of material haphazardly into intact vegetation, against trees and in close proximity to watercourses without controls, safeguards or records.

Stage 1 of the Beach Rd Stockpile Depot involved the establishment and formalisation of an initial stockpile area within highly disturbed land which contained historic stockpiled material. On-site material and spoil from current activities was sampled, analysed and classified under the *Protection of Environment Operations (Waste) Regulation 2014*. Suitably compliant material was applied to the land in accordance with relevant NSW resource recovery exemptions (RRE's), to level the Stage 1 site, stabilise accessways from Beach Rd, and to create a delineated buffer to an adjacent watercourse to prevent encroachment and to minimise the risk of impacts associated with sediment movement and contamination. Material classified as Excavated Natural Material (ENM), with moderate to high organic content was applied to a secondary, moderately disturbed area to fill and level and allow it to grass over and regenerate.

The footprint of the current Stage 2 proposal was determined after comprehensive vegetation assessment, to be situated in an area of low-quality vegetation (i.e. disturbed and lacking important habitat features and characteristics), with provision of suitable buffers to minimise the risk of impacts on watercourses, higher integrity vegetation and other sensitive environments, while retaining vegetation connectivity.

The location and orientation of the Stage 2 area would allow for utilisation of historically disturbed land in accordance with its classification as operational land, while ensuring the retention and protection of moderate to high-quality vegetation and habitat over the site; ensuring the retention of fauna movement corridors; and providing for vegetation screening to minimise impacts on the aesthetic values of the site. Refer to sections 2.1 and 3.2.2 for more information.

Works to develop the Stage 2 footprint would be staged and would involve the implementation of safeguards and mitigation measures, including a Soil and Water Management Plan (SWMP), to minimise the risk of impacts (particularly associated with erosion and sediment movement) on the environment.

The ongoing operation of Beach Rd Stockpile Depot would be guided by a management plan to ensure that safeguards to protect the environment continue to be implemented and that effective organisation and management of construction and maintenance waste materials is carried out in accordance with relevant legislation.

2. EXISTING ENVIRONMENT

The site was assessed by a Council Environmental Officer with investigations carried out on 16th November 2022, 14th December 2022, 17th March 2023 and 8th December 2023. Investigations involved: comprehensive vegetation and habitat assessment; determination of vegetation communities; targeted survey for potentially occurring threatened flora species (including *Daphnandra johnsonii* and *Rhodamnia rubescens*); investigation of habitat availability on site for threatened fauna species and cryptic threatened flora species (including threatened terrestrial orchids); baited remote sensor camera trap surveys undertaken from 10th February to 17th March 2023; and investigation for potential Aboriginal and non-indigenous heritage objects.

Photos of the site are provided in section 2.3.1 below.

2.1 Subject site – general description

The subject site is a predominantly vegetated parcel of land, bordered by Beach Rd to the south, Toolijooa Rd to the east, a railway line to the north and Harley Hill Cemetery to the west.

The site is accessed from Beach Rd. An existing band of vegetation adjacent to Beach Rd, along a berm of varying height, restricts access to three existing entryways. A cleared corridor containing overhead power lines and a vehicle track occurs parallel to Beach Rd approximately 10 to 15 m from the road pavement, extending westward to the Harley Hill Rd Cemetery entry and eastwards to Toolijooa Rd. Gates have been installed at each of the three entryways and a rock barrier has been installed across the track in the western portion of the site to further control access and discourage illegal dumping.

Parts of the subject site, particularly along Beach Rd, have been subject to historic disturbance. Evidence of past clearing, dumping of rubbish and informal stockpiling of materials was apparent during investigations.

Two existing, cleared and disturbed areas adjacent to the vehicle track comprised the site of the Stage 1 stockpile site (refer to Figure 1).

A minor, mostly overgrown, vehicle track occurs near the western property boundary.

The site is otherwise vegetated with variable condition, and with no other vehicle access.

2.2 Topography, geology and soils

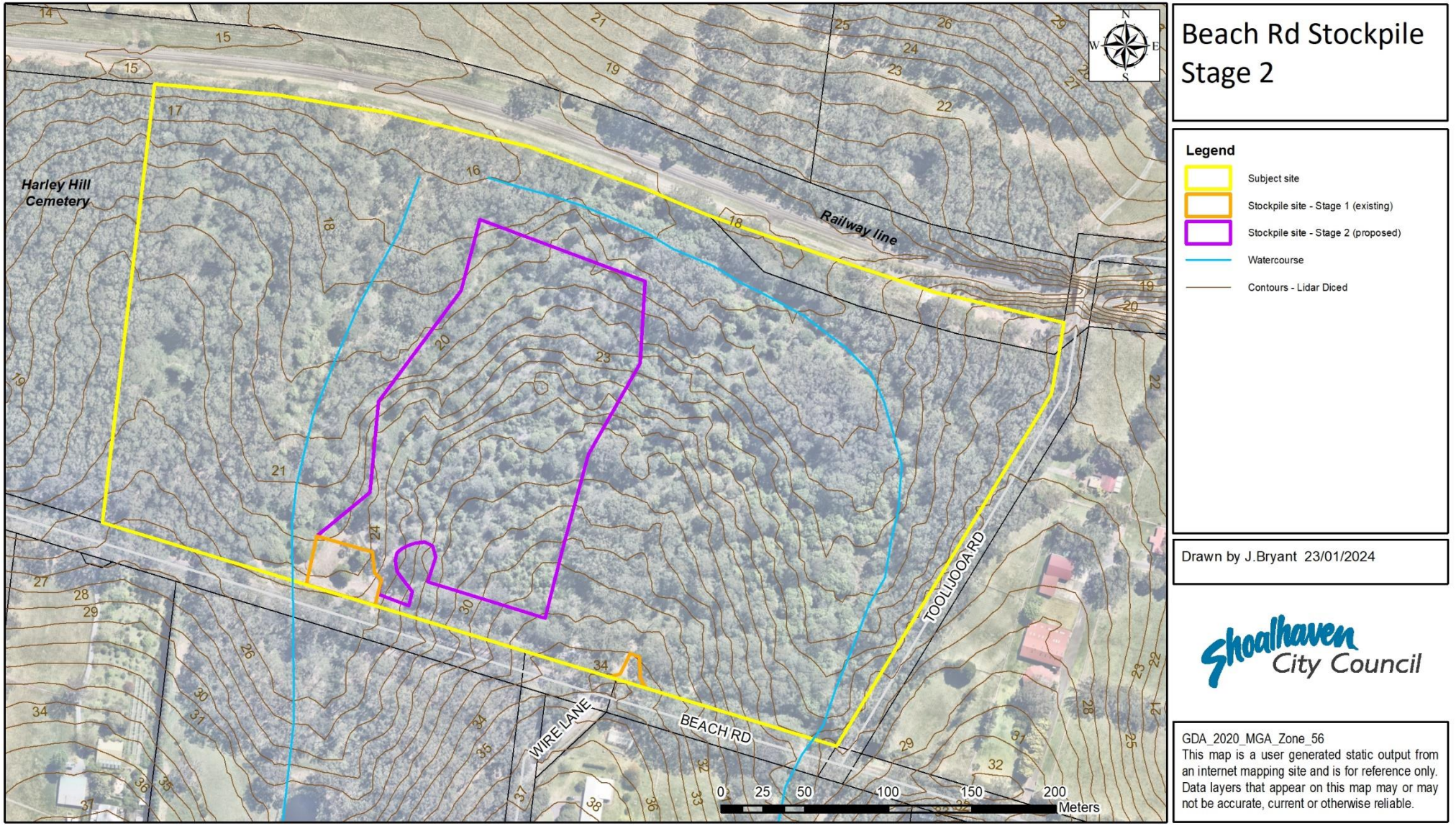
The subject site has a general, northern aspect, containing three gentle spurs divided by shallow valleys (Figure 4). The Stage 2 footprint has a general north-north-west aspect. Altitude ranges from 34 m above sea-level (ASL) opposite Wire Lane to 16 m ASL in the north-western corner of the site.

Slope over the Stage 2 footprint is approx. 6.5% (south-east corner to north-west corner).

Two first-order (Strahler) watercourses occur within the site along the shallow valleys, both flowing northward from Beach Rd via drainage culverts. The western watercourse travels approximately northward toward the railway line, while the eastern watercourse travels northward and curves around to travel westward, merging with the western watercourse in the north-western portion of the site.

The western watercourse is broad, shallow, vegetated and without a defined channel.

Figure 4. Topography of the site



The eastern watercourse contains a small, defined channel (approx. 0.6 – 0.7 m wide and 0.5 m deep) to north of Beach Rd, becoming broad (30 – 40 m wide) and undefined in the north-eastern portion and into the north-western portion of the site. Two small ponds / dams occur along the northern stretch of the eastern watercourse, one being 6.0 m across and 0.5 m deep (approx.) approx. 35.0 m to the north of the Stage 2 footprint; the other, 8.0 m across and 1.0 m deep (approx.) and approx. 120.0m to the east of the Stage 2 footprint.

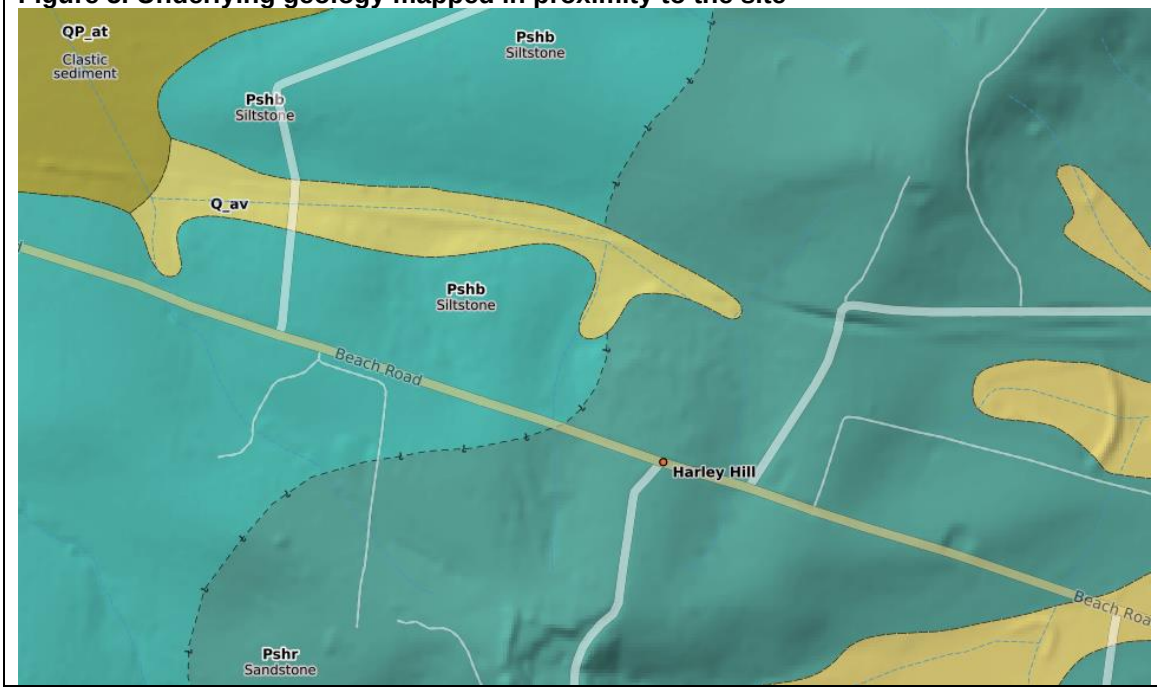
The railway line along the northern boundary of the site is elevated and appears to form a hydraulic barrier. Both watercourses fan out into undefined, broad swales which merge in the north-western portion of the site and follow the railway line to the west toward Broughton Creek, over 1.5 km from the site.

The underlying geology of the eastern portion of the site is mapped as Broughton Formation sandstone, with Berry siltstone occurring in the western portion of the site, and alluvial valley deposits occurring along the lower watercourse areas in the north-western part of the site[1] (Figure 5).

A nearby recorded soil profile assessment[2] taken approx. 100 m from the site, south of Beach Rd at an elevation of approx. 26 m ASL, with similar aspect and vegetation characteristics to the site, described the soil as having a soft surface condition with a moderately well drained profile and slight erosion hazard. The upper 0 – 0.2 m horizon consisted of dark, yellowish-brown silty clay over a 0.2 – 0.6m horizon yellowish red (reddish brown) medium clay with weak pedality (rough-faced peds).

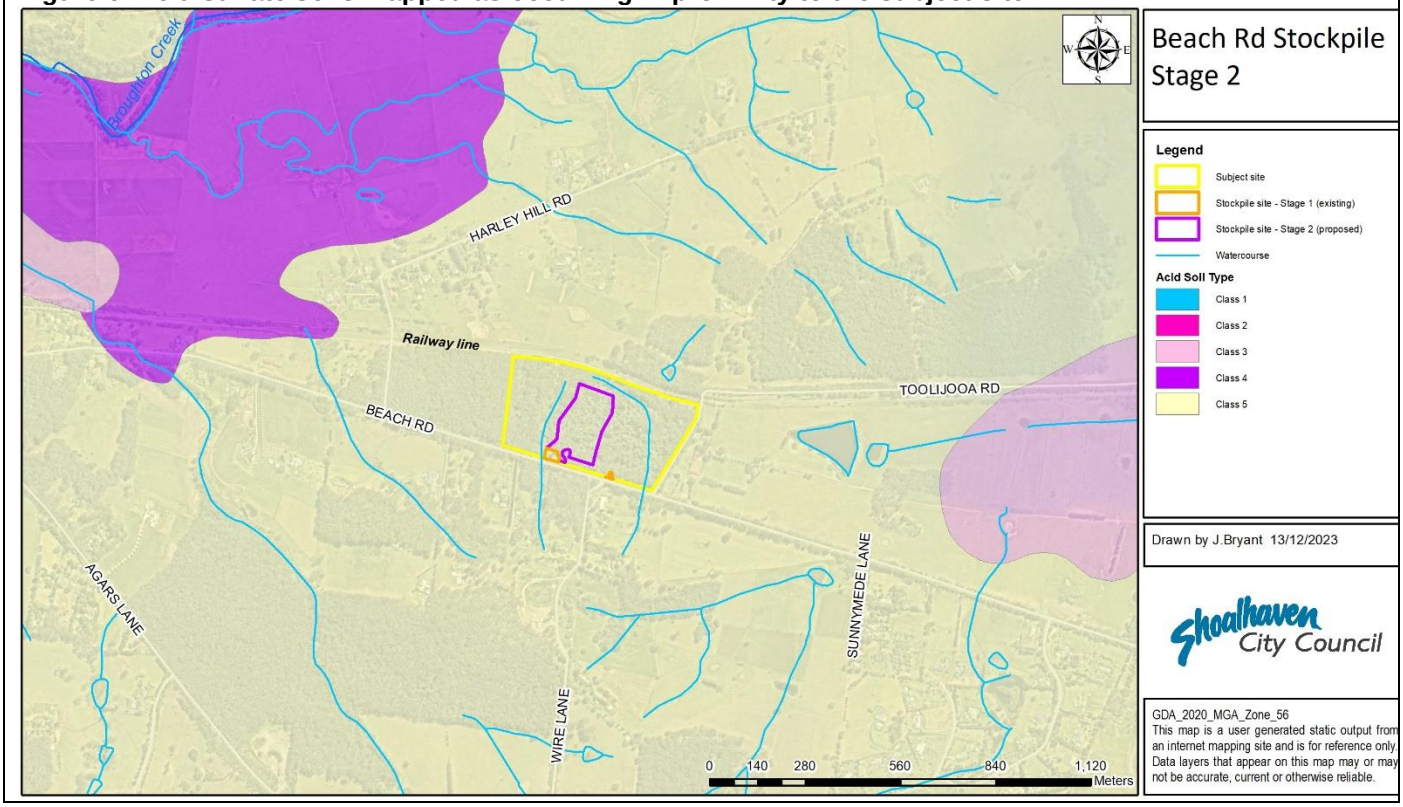
The subject site and surrounds are mapped as Class 5 Acid sulfate soils (A.S.S), with Class 4 A.S.S. mapped as occurring approximately 700 m to the west of the proposed Stage 2 footprint and Class 3 A.S.S. mapped as occurring approximately 1 km to the east of the proposed Stage 2 footprint (Figure 6).

Figure 5. Underlying geology mapped in proximity to the site[1]



[1] Source: MinView https://minview.geoscience.nsw.gov.au/#/?lon=148.5&lat=-32.50000&z=7&l=
[2] Source: eSpade survey number 10000483 available from https://www.environment.nsw.gov.au/eSpade2Webapp/

Figure 6. Acid sulfate soils mapped as occurring in proximity to the subject site



2.3 Terrestrial habitat and vegetation assessment

NSW Plant Community Type (PCT) vegetation mapped as occurring in proximity to the subject site (refer to Figure 7) includes:

- PCT3077 Illawarra Complex Dry Rainforest. This PCT is associated with Illawarra Sub-tropical Rainforest threatened ecological community (TEC).
- PCT3153 Illawarra Escarpment Bangalay x Blue Gum Wet Forest. This PCT is not associated with any TEC.
- PCT3154 Illawarra Blackbutt Moist Forest. This PCT is not associated with any TEC.
- PCT4009 Shoalhaven Lowland Flats Wet Swamp Forest. This PCT is associated with NSW Swamp Sclerophyll Forest on Coastal Floodplains TEC.
- PCT4051 South Coast Lowland Red Gum-Swamp Oak Forest. This PCT is not associated with any TEC.

On-site vegetation communities were determined based on comprehensive flora surveys and mapping was revised accordingly (refer to Figure 8) for the purpose of this assessment. Comprehensive flora species lists are included in Appendix A.

PCT3154 and PCT4009 were confirmed as occurring within the subject site. PCT3153, which is mapped as occurring along Beach Rd to the east of the site, was found to occur extensively within the site. PCT4051 and PCT3077 were not found to occur within or in close proximity to the subject site.

Through most areas within the subject site, the age class of trees is generally low, indicating that historic clearing has occurred.

PCT3154 Illawarra Blackbutt Moist Forest

Tall wet-sclerophyll forest dominated by *Eucalyptus pilularis* Blackbutt and identified as PCT3154 Illawarra Blackbutt Moist Forest of moderate to high condition, occurs on elevated parts of the subject site, including: the central spur opposite Wire Lane; along Toolijooa Rd and through the north-east corner of the site; and along the western edge of the site, extending into the adjacent Harley Hill Cemetery land (refer to Figure 8).

In areas of moderate to high condition, this vegetation has an open, grassy understorey dominated by *Oplismenus imbecillis* (Basket Grass) with *Carex longebrachiata* (Carex), *Entolasia stricta* (Wiry Panic Grass), *Microlaena stipoides* (Weeping Meadow Grass), *Marsdenia rostrata* (Milk Vine), dense leaf litter in some areas and *Imperata cylindrica* (Blady Grass) or *Calochlaena dubia* (Rainbow Fern) in open areas, with occasional small trees including *Notelaea longifolia* (Mock Olive), *Clerodendrum tomentosum* (Hairy Clerodendrum) and *Acacia spp.* (Wattle species).

In the north-east corner of the site and extending along Toolijooa Rd, older age class trees are present including Blackbutt trees up to 60 – 70 cm diameter at breast-height (DBH).

A large, disturbed area exists in the centre of the subject site, extending roughly northward from the established Stage 1 stockpile area. This area contains scattered, young *Eucalyptus saligna-botryoides* to 20 cm DBH, occasional *Acacia mearnsii* (Black Wattle), *Acacia binervata* (Two-veined Hickory), *Alphitonia excelsa* (Red Ash) and *Glochidion ferdinandi* (Cheese Tree) to 15 cm DBH, and very dense infestation of *Lantana camara* (Lantana) in the mid-storey. The footprint of the Stage 2 stockpile site proposal would be situated within this area to minimise impacts on the environment and retain the more intact vegetation on the property.

For the purpose of this assessment, the central disturbed area is considered to be “low condition” PCT3154 (noting that it may have been – or may have been influenced by – PCT3153) as it has been subject to substantial disturbance in the past, as evidenced by a combination of high level weed infestation (primarily Lantana) in the understorey, low biodiversity (i.e. limited number of species), and sparseness and young age class of trees, with lack of canopy connectivity.

PCT4009 Shoalhaven Lowland Flats Wet Swamp Forest

Swampy sclerophyll open forest, identified as PCT4009 Shoalhaven Lowland Flats Wet Swamp Forest, occurs as a riparian corridor band, associated with the broad, open, swampy, western watercourse and extending from Beach Rd to the railway line in the western portion of the site (refer to Figure 8).

Where PCT4009 occurs within the site, *Eucalyptus robusta* (Swamp Mahogany) is the dominant canopy tree, with occasional *Angophora floribunda* (Rough-barked Apple). *Glochidion ferdinandi* (Cheese Tree) occurs frequently as an understorey tree, particularly in the southern stretch of the watercourse with *Myrsine variabilis* (Muttonwood), and groundcover dominated by sedges including *Carex appressa* (Carex), *Carex longebrachiata* (Carex), *Carex maculata* (Carex) and *Gahnia sieberiana* (Red-fruited Saw-sedge). Toward the northern end of the site, this vegetation community becomes more woodland-like in structure, with both Swamp Mahogany and *Eucalyptus saligna x botryoides* (Southern Bluegum) as canopy trees, and with a more open understorey and greater presence of grasses including *Imperata cylindrica* (Blady Grass) and Tussock (*Poa labillardieri*).

PCT4009 within the site is considered to be representative of both NSW Swamp Sclerophyll Forest on Coastal Floodplains TEC and Commonwealth *Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland* (EPBC Act).

Exotic, invasive species including *Setaria sphacelata* (South African Pigeon Grass) and *Ageratina adenophora* (Crofton Weed) occur as scattered patches in disturbed open areas.

PCT3153 Illawarra Escarpment Bangalay x Blue Gum Wet Forest

Tall, wet-sclerophyll forest dominated by *Eucalyptus saligna x botryoides* (Southern Blue Gum) and identified as PCT3153 Illawarra Escarpment Bangalay x Blue Gum Wet Forest occurs as a riparian corridor band, associated with the eastern watercourse extending northward from Beach Rd at the Toolijooa Rd intersection and curving around toward the north-western corner of the site, and also occurs in a band to the west of the western watercourse (refer to Figure 8).

To the west of the western watercourse, PCT3153 is dominated by Southern Blue Gum of mixed age class (5-50 cm DBH) with shrubby / grassy understorey with understorey trees including *Acacia binervata* (Two-veined Hickory), scattered *Livistona australis* (Cabbage Palm), mid-storey plants including *Gahnia melanocarpa* (Black-fruited Saw-sedge), and groundcover dominated by *Oplismenus imbecillis* (Basket Grass), *Lastreopsis microsora* (Creeping Shield Fern), *Imperata cylindrica* (Blady Grass), *Pteridium esculentum* (Bracken Fern) and *Entolasia stricta* (Wiry Panic Grass). Exotic invasive *Lantana camara* (Lantana) occurs through the understorey, becoming dense toward the north of the site.

Associated with the eastern watercourse, PCT3153 occurs as a riparian corridor with a canopy dominated by *Glochidion ferdinandi* (Cheese Tree) with Southern Blue Gum overstorey trees, a mid-storey including *Acmena australis* (Lilli Pilli), *Melaleuca linarifolia* (Flax-leaved Paperbark), *Cyathea australis* (Rough Tree Fern) and *Cyathea cooperi* (Straw Tree Fern), and groundcovers including *Lastreopsis microsora* (Creeping Sedge Fern) and *Carex maculata* (Carex). Exotic invasive plants including *Ageratina riparia* (Mistflower), *Lonicera japonica* (Japanese Honeysuckle), Lantana and seedlings of *Ligustrum sinense* (Small-leaf Privet) are present.

The two small ponds / dams occurring on the northern stretch of the eastern watercourse contain *Juncus* (Rush) and *Elaeocharis* (Spike Rush) species and *Persicaria spp.* (Knot Weed).

Figure 7. NSW Plant Community Type (PCT) vegetation mapped as occurring over and in proximity to the subject site

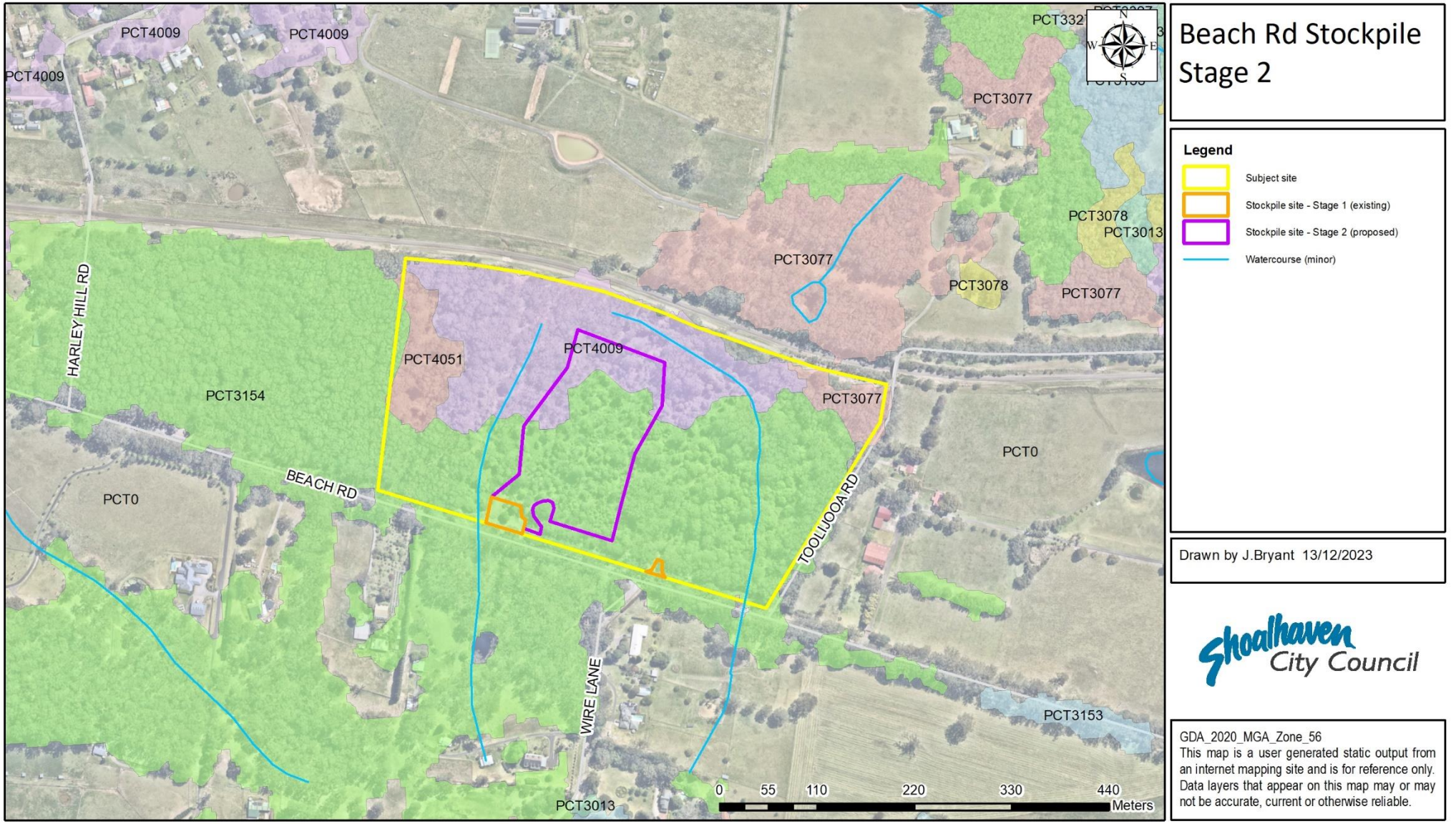
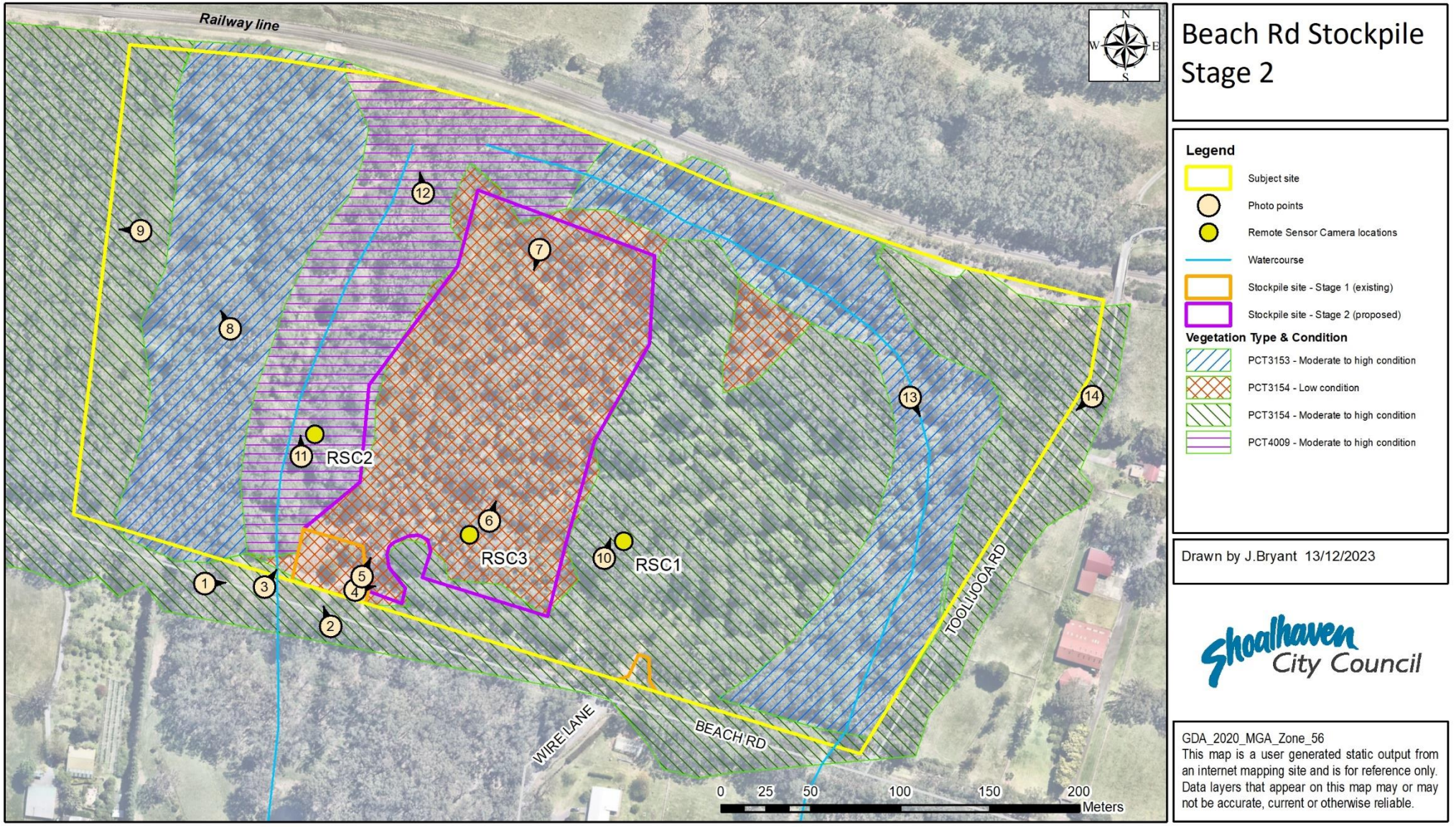


Figure 8. Vegetation identified during on-site investigations, with photo locations and the proposed Stage 2 footprint



2.3.1 Site photos showing relevant vegetation and habitat features

Photo 1. The site viewed from Beach Rd

Photo 2. Main gated entrance on Beach Rd

Photo 3. Existing stockpile area adjacent to riparian corridor and proposed Stage 2 stockpile area in background

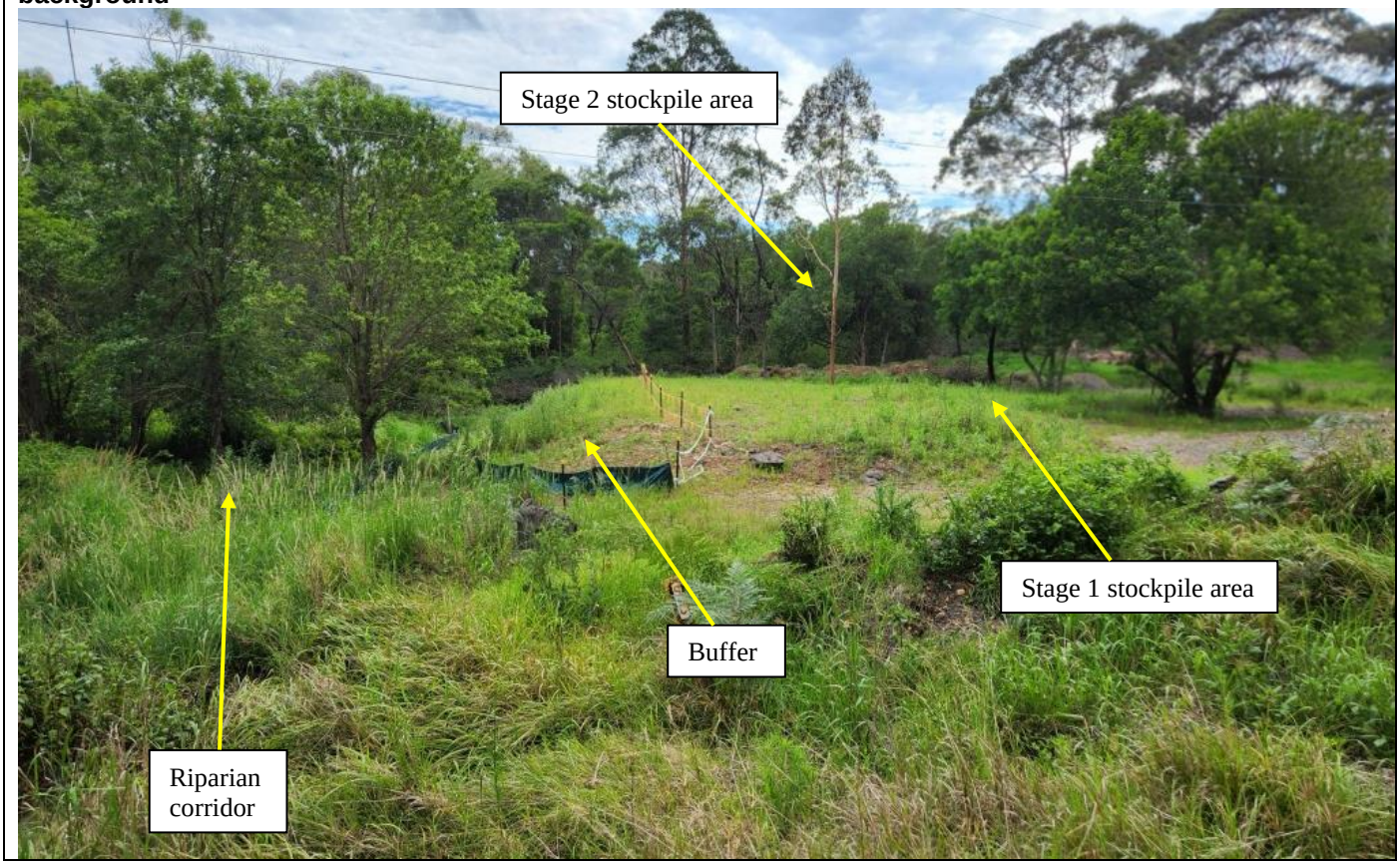


Photo 4. Cleared power line / track corridor and adjacent vegetated buffers to be retained

Photo 5. Disturbed vegetation where proposed Stage 2 stockpile area would occur

Photo 6. Typical low-condition vegetation in disturbed area where Stage 2 stockpile would occur

Photo 7. Typical low-condition vegetation in disturbed area where Stage 2 stockpile would occur

Photo 8. Moderate to high-condition Blue Gum Forest in western portion of the subject site (to be retained)

Photo 9. Moderate to high-condition Blackbutt forest in western portion of the subject site (to be retained)

Photo 10. Moderate to high-condition Blackbutt forest in eastern portion of the subject site (to be retained)

Photo 11. Riparian corridor (to be retained)

Photo 12. Riparian corridor near railway track (to be retained)

Photo 13. Riparian corridor in Blue Gum forest (eastern portion of subject site) (to be retained)

Photo 14. North-east portion of the subject site viewed from Toolijooa Rd (to be retained)

2.3.2 Targeted fauna and threatened species surveys

Survey for potentially occurring threatened flora species including *Daphnandra johnsonii* (Illawarra Socketwood) and *Rhodamnia rubescens* (Scrub Turpentine), in addition to potential habitat features for threatened fauna species (including hollow-bearing trees and feed trees) was carried out in conjunction with flora surveys over the subject site.

Comprehensive survey through some areas, including the central disturbed area, was limited due to dense Lantana in the understorey restricting access and forcing indirect survey transects. The survey was however, considered adequate to discount the presence of potentially occurring threatened flora species. Higher vantage points were utilised where available to scan the surrounding vegetation; alternative routes were used to enter dense areas where direct transect alignments did not allow; and the level of disturbance and density of Lantana itself were cause to rule out the presence of native vegetation in some areas.

No threatened flora including *Daphnandra johnsonii* (Illawarra Socketwood) or *Rhodamnia rubescens* (Scrub Turpentine), nor suitable habitat for locally occurring threatened orchid species was identified on site during vegetation surveys.

No hollow-bearing trees, Glossy Black Cockatoo (*Calyptorhynchus lathami*) feed trees (i.e. *Allocasuarina littoralis* with characteristic chewed cones), nor Yellow-bellied Glider (*Petaurus australis*) feed trees (e.g. *Corymbia gummifera* or *Eucalyptus punctata* with v-shaped feeding scars) were observed within the site. No evidence of potential threatened fauna (e.g. owl white-wash or other threatened fauna scats) was observed during investigations.

Incidental observations of fauna were recorded during flora surveys, including Crimson Rosella, Kookaburra, Australian Raven, Yellow-tail Black Cockatoo, Grey Shrike Thrush and Black-faced Monarch. Striped Marsh Frog (*Limnodynastes peronii*) was recorded in the ponds.

Remote sensor cameras (Reconyx Hyperfire 2) were installed in three locations (RSC 1, RSC 2 and RSC 3 – refer to Figure 8) from 10th February to 17th March 2023 as follows:

- RSC 1 was located within moderate to high-condition PCT3154
- RSC 2 was located within moderate to high-condition PCT4009
- RSC 3 was located within low-condition PCT3154

Secure bait stations were installed immediately in front of the cameras, with aromatic bait comprising a mix of tuna, oats and peanut butter placed inside.

Red-necked Wallaby (*Macropus rufogriseus*), Bush rat (*Ratus fuscipes*) and Long-nosed Bandicoot (*Perameles nasuta*) were recorded at each location. Additionally, Common Wombat (*Vombatus ursinus*) and Brush-tailed Possum (*Trichosurus vulpecula*) were each recorded on one occasion only at RSC 3 (in low-condition PCT3154). It is possible that wombat burrows may exist in the central, disturbed area beneath Lantana. No tree hollows suitable for Brush-tailed Possum were observed within the site during investigations, suggesting that the animal recorded may utilise habitat outside the site, or otherwise may be using habitat which is concealed by dense Lantana.

While more species were recorded at RSC 3, the frequency of recordings was higher at the other locations, particularly RSC 2, where numerous and frequent Bandicoot and Bush Rat recordings occurred, sometimes with two animals in one image, suggesting that this habitat is more important and supports larger numbers of animals than the low-condition vegetation.

No threatened fauna species were recorded in the remote sensor camera surveys.

Targeted nocturnal spotlighting and stag-watching surveys were considered unnecessary to inform the assessment, since no suitable den or nesting habitat for threatened gliders, cockatoos, parrots or large forest owls was found to be present within the subject site.

Photos 15 through 18 below provide examples of fauna recorded in the remote sensor camera surveys.

Photo 15. Bush Rat recorded at RSC 1 in moderate to high condition PCT3154

Photo 16. Long-nosed Bandicoot recorded at RSC 2 in moderate to high condition PCT4009

Photo 17. Red-necked Wallaby recorded at RSC 2 in moderate to high condition PCT4009

Photo 18. Brush-tailed Possum recorded at remote sensor camera location 3 (RSC 3) in low condition PCT3154

2.4 Bush fire risk

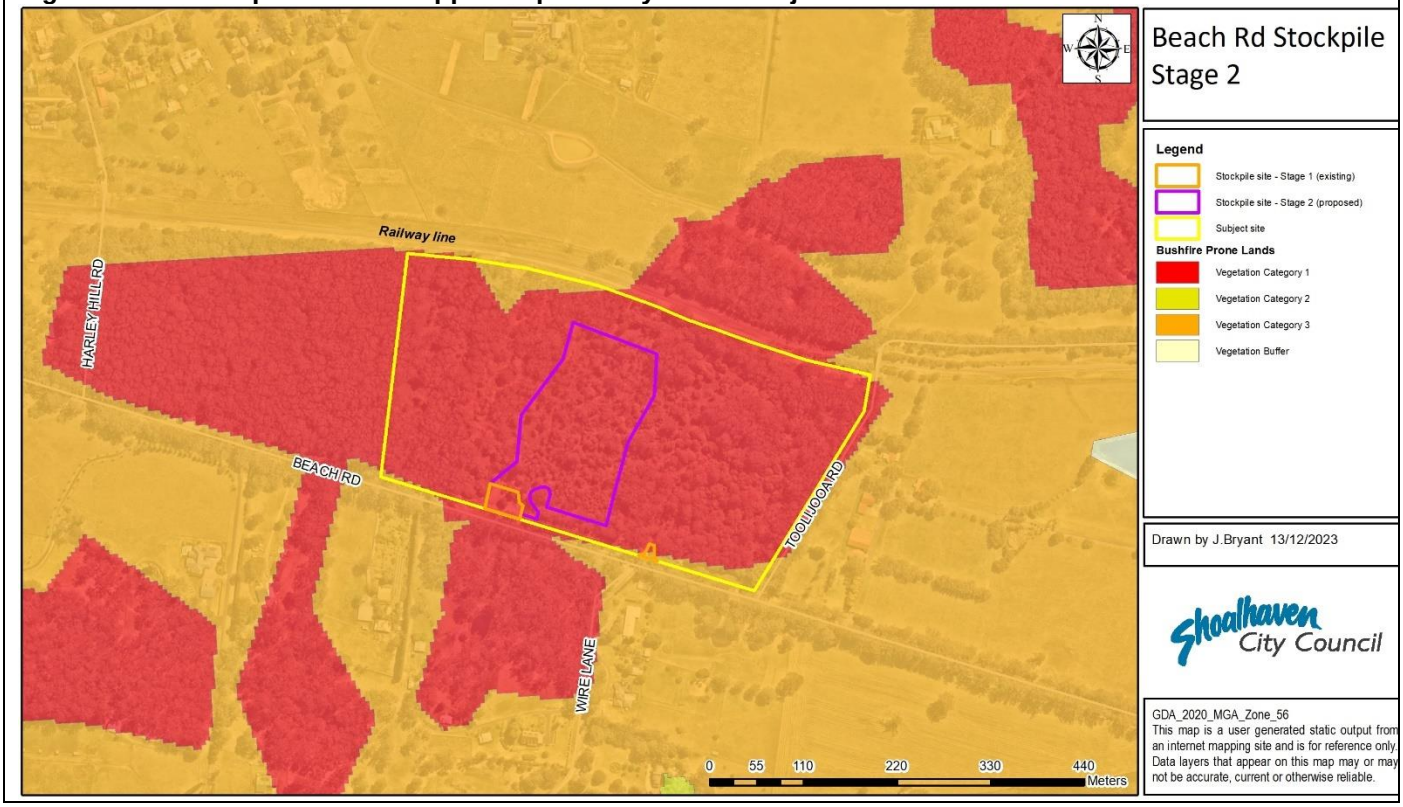
The proposed stockpile site and most of the subject site is mapped as Vegetation Category 1 Bushfire Prone Land (Figure 9).

Vegetation Category 1 is considered to be the highest risk for bush fire. This vegetation category includes areas of forest, woodlands, heaths (tall and short), forested wetlands and timber plantations and has the highest combustibility and highest likelihood of forming fully developed fires including heavy ember production (NSW RFS 2015).

While the bush fire risk does not affect the establishment of the Stockpile Depot, consideration of bush fire risk and any requirements for asset protection zones shall be considered in the location of sheds and other storage structures.

Sheds and other storage structures shall be situated within the currently proposed Stockpile Depot footprint (i.e. Figure 1), away from the vegetation edges, so that appropriate asset protection zones are provided for within the footprint without requiring any further clearing.

Figure 9. Bushfire prone land mapped in proximity to the subject site



2.5 Other

Harley Hill Cemetery, to the immediate west of the subject site, is listed as a heritage item on the *Shoalhaven Local Environment Plan 2014* (SLEP) and the NSW State Heritage Register.

No potential Aboriginal and non-indigenous heritage objects were observed within the site during investigations, noting that accessibility and visibility were limited in some areas due to dense understorey vegetation, particularly Lantana infestations.

In the context of this REF, the subject site of the proposed activity:

- is not an Aboriginal Place in the context of the NSW National Parks and Wildlife Act 1974, nor is it known to contain Aboriginal artefacts
- is not mapped as flood liable land;
- is not mapped as "potentially contaminated land"
- is not mapped as being within the "coastal management areas" (*e.g.* littoral rainforest, coastal wetlands, *etc*.) for the purposes of Part 2.2 of the *State Environmental Planning Policy (Resilience and Hazards) 2001*;
- is not subject to any Aboriginal land rights claims made under the NSW *Aboriginal Land Rights Act 1983.*

No further consideration of these matters is required.

3. ASSESSMENT OF LIKELY IMPACTS ON THE ENVIRONMENT

3.1 Impacts associated with the proposal

The proposal would involve disturbances, direct impacts and potential risks associated with development of the Stage 2 footprint, as well as the ongoing operation of the Beach Rd Stockpile Depot as follows.

Potential impacts on the environment associated with development of the Stage 2 footprint of Beach Rd Stockpile Depot

- *Removal of 2.58 ha disturbed, low-condition native vegetation*.

  The footprint of the current Stage 2 proposal would be situated in a historically disturbed area of vegetation consisting of scattered, young trees (to approx. 20 cm DBH, with no hollows) and an understorey which is predominantly exotic Lantana – a weed of national significance.

  The area to be cleared would be delineated prior to vegetation removal to prevent encroachment into higher condition vegetation to be retained and protected.

  Vegetation removal would be monitored by Council's Environmental Officer, involving inspection of burrows and other habitat, and exclusion or relocation of resident fauna as appropriate.

  Moderate to high-quality vegetation and habitat over the site would be protected, retaining a band of vegetation along the northern edge of the site and a screen extending partway along the southern edge of the site providing for connectivity and fauna movement.

  A 3.0 m buffer to surrounding vegetation would be established around the perimeter of the Stage 2 footprint, with sediment controls (silt fence and coir logs as appropriate) and establishment of low, native groundcovers, to stabilise the edge and provide a vegetated buffer with filtration to adjacent land.

  The vegetation buffer zone around the perimeter of the site shall be fenced or otherwise delineated and shall be identified with signage as "environmental area".

  Impacts associated with vegetation and habitat removal are further discussed in section 3.2 and 3.3.

- *Increase to surface water flow and potential for erosion and sediment movement.*

  Clearing of the land would increase the potential for erosion and sediment movement.

  The design of the stockpile site layout shall provide for level, stabilised, terraced areas for functionality of the stockpile depot and to reduce the area of effective slopes which are subject to potential erosion. Constructed and retained slopes within the footprint shall be stabilised with hard or soft landscaping as appropriate, depending on the gradient.

  Clearing and development of the Stage 2 footprint shall be staged to minimise the area of disturbed and unstabilised land which is prone to erosion, at any one time. Staging shall involve clearing and stabilising of the lower, western edge of the footprint through to the north-west corner of the site, and the establishment of a permanent sediment basin, prior to the development of other areas of the site. Staging should involve the complete development of terraced levels (or otherwise separate areas) to every practical extent.

Wherever possible, clearing and development of the site shall be carried out in drier months (mid-Autumn through to mid-Spring) to reduce the risk of erosion and sediment movement.

Levelling and stabilisation (compaction) of stockpile areas and access roads would reduce the risk of erosion and sediment movement, but would in turn, result in a reduction of permeability of the ground surface over the Stage 2 footprint, an associated increase to surface water flow and a potential increase to concentrated water flows at discharge locations.

Internal drainage shall be incorporated into the stockpile depot design which includes: diversion banks above stockpile areas; drainage between stockpile areas containing filtration and energy dissipation; and a permanent sediment basin.

As per recommendations of the Blue Book, given that the area of land which would be disturbed exceeds 2500 m^2, a Soil and Water Management Plan (SWMP) would be developed to ensure appropriate staging, controls and mitigation measures are implemented to reduce risks associated with surface water flow, erosion and sediment movement. The SWMP shall provide details for construction of the sediment basin in initial staging of works which would remain in place and in ongoing service of the stockpile depot.

Potential impacts on water quality, riparian corridors and key fish habitat associated with surface water flow, erosion and sediment movement are further discussed in section 3.6.

- *Levelling and stabilisation of stockpile areas and internal access roads, including application of suitable waste material to the land*.

  Erosion and sediment controls would be installed as per the site specific SWMP across the slope and above and within drainage lines as appropriate, to minimise erosion of soil and sediment movement into watercourses following vegetation clearing and earth-moving activities. Any temporary sediment and erosion controls shall be maintained until associated areas of the site are suitably stabilised and the risk of sediment movement is minimal. Permanent drainage infrastructure shall be maintained as required.

  All application of waste material to land would be in accordance with relevant NSW Resource Recovery Exemptions (RRE's) under the *Protection of Environment Operations (Waste) Regulation 2014*.

  Impacts and other considerations associated with disturbance of soil, including potential impacts on indigenous (s3.4) and non-indigenous (s3.5) heritage items, potential impacts on water quality and aquatic habitat (s3.6) and application of waste material to the land (s4.3) are further discussed in sections 3.4, 3.5, 3.6 and 4.3.

- *Construction / installation of storage sheds*.

  Construction or installation of storage sheds would be undertaken on levelled and stabilised ground (refer above) and would be situated to provide for suitable asset protection zones (APZs) within the existing Stage 2 footprint, with out requiring any additional vegetation clearing.

  Appropriate safeguards shall be implemented for the storage of hazardous products (e.g. fuels and pesticides) including: containment and isolation with sealed, bunded areas; signage; and provision of on-site spill kits.

  Refer to environmental safeguards and mitigation measures in section 7.

- *Visual amenity of the site*

  The existing subject site including the Stage 1 footprint of Beach Rd Stockpile Depot is disturbed and contains stockpiled material.

  The subject site occurs on an undulating semi-rural road with treed and naturally vegetated areas of land in proximity.

  The Stage 2 footprint has been located to extend into the subject site within previously disturbed areas away from – and with minimal frontage to – Beach Rd, while retaining vegetated land to the west, north and east, and vegetated screens to the south which would minimise impacts on the visual amenity and other aesthetics of the location.

  Vegetated screens along Beach Rd shall be enhanced with planting of low shrubs to further reduce visual impacts, while maintaining appropriate sight lines.

  Refer to environmental safeguards and mitigation measures in section 7.

<u>Potential impacts on the environment associated with the ongoing operation of Beach Rd Stockpile Depot</u>

- *General operations management*

  The site would be utilised by Council staff and possibly contractors for the stockpiling, storage and retrieval of construction and waste materials associated with Council construction and maintenance works. Access to the site would be restricted (including by gated entryways) and managed for this purpose to prevent uncontrolled stockpiling or dumping of material on the site.

  A management plan shall be developed for the operation of the stockpile depot which incorporates the safeguards and mitigation measures included in this REF which are relevant to ongoing operations. Any staff or contractor utilising the stockpile depot shall be required to do so in accordance with the management plan.

  The management plan shall be reviewed on a yearly basis and revised as appropriate, with consideration of stockpile operations (including staff compliance with processes and protocols; and effective organisation and management of materials) and impacts on the environment (including erosion and sediment management; weed infestations; and encroachments into protected environmental areas).

- *Storage and management of waste material*

  Ongoing operation of the site would include the temporary storage, sorting, testing and treatment of construction and maintenance waste materials for reuse in accordance with relevant NSW Resource Recovery Exemptions (RRE's) under the *Protection of Environment Operations (Waste) Regulation 2014*, or where appropriate, disposal at a licenced facility.

  Material received at the stockpile site shall be limited to construction materials and components and waste material intended for temporary storage and appropriate reuse or subsequent off-site disposal only.

No material which is known to be special waste, liquid waste or hazardous waste shall be imported to the site (refer to NSW EPA Waste Classification Guidelines).

Appropriate placement and labelling of stockpiles shall be implemented to facilitate record-keeping, testing and management of material.

The vegetation buffer zone around the perimeter of the site shall be fenced or otherwise delineated and shall be identified with signage as “environmental area”. Any material stored at the site shall be placed within designated stockpile areas without encroaching into the buffer zone or other native vegetation areas.

Refer to environmental safeguards and mitigation measures in section 7.

- *Dust movement*

  Stockpile areas and access roads would be stabilised to reduce the risk of erosion and sediment movement and would therefore be less susceptible to dust movement.

  The stockpile depot would occur in a sheltered location, partly within a valley, with elevated and vegetated ridges to the east and west. The site is surrounded by vegetation to the west, north and east, and vegetated screens would be retained and enhanced to the south.

  If stockpiles are to be in place for more than 10 days, they shall be stabilised, e.g. with sterile grass seed or covered with geofabric.

  Stockpiles and exposed ground shall be wet down where the risk of dust movement is high. It is recommended that if sheds are constructed, water tanks should be installed to capture rain from the shed roofs for this purpose.

  Refer to environmental safeguards and mitigation measures in section 7.

- *Sound and vibration*

  Sound and vibration generated from operation of the stockpile depot would be limited to infrequent movements by tipper trucks of varying size, excavator (or smaller machine) operation within the site associated with stockpile management, excavator transport, smaller operational and passenger vehicles, and possibly the operation of portable water pumps and generators.

  No drilling, blasting or rock-breaking would occur.

  Under normal circumstances, the operation of vehicles within the site would occur on an as-needed basis within normal construction works hours (i.e. generally between 7.00am and 6.00pm) and is not anticipated to be daily nor continuous throughout the day[3].

  There are no close receivers of operational sound and vibration impacts. The site occurs in a rural area with the nearest house over 100 m from the proposed Stage 2 footprint.

  The Stage 2 footprint extends northward, away from and below the closest houses. Ridges elevated above the footprint occur to the east and west. The site is surrounded by vegetation to the west, north and east, and vegetated screens would be retained and enhanced to the south.

[3] Note that in response to natural disaster or emergency situations, operations may be more frequent and may be required to occur outside of normal construction works hours.

It is therefore unlikely that the operation of the stockpile depot would result in unacceptable noise or vibration impacts on neighbouring properties.

- *Vehicle access and egress of the site*.

  While it is not anticipated that the proposal would result in a significant increase in traffic, the use of the stockpile site would involve the access and egress of vehicles between Beach Rd and the site in a location with inherent risk due to the speed limit (80 km/hr) and visibility affected by vegetation and hilly terrain.

  Appropriate safeguards shall be implemented to reduce this risk, including limiting access and egress to the main gate, and managing vegetation to provide for clear line-of-sight in both directions from the entrance.

  It is also recommended that signage advising other motorists of "trucks turning" be installed on approach to the entrance from both directions.

  A stabilised entry of ballast rock shall be constructed near the main gated entryway to the site to reduce soil being tracked onto Beach Rd.

  Refer to environmental safeguards and mitigation measures in section 7.

Potential impacts on the environment, including indirect impacts have been considered and assessed including:

- Impacts on threatened species;
- Impacts on indigenous and non-indigenous heritage;
- Impacts on water quality, the riparian zone and key fish habitat;
- Impacts associated with flood liable land.

Each of these is discussed below.

3.2 Threatened species impact assessment (NSW)

Section 1.7 of the EP&A Act 1979 applies the provisions of Part 7 of the NSW *Biodiversity Conservation Act 2016* and Part 7A of the *NSW Fisheries Management Act 1994* that relate to the operation of the Act in connection with the terrestrial and aquatic environment. Each are addressed below.

3.2.1 Part 7A *Fisheries Management Act 1994*

Part 7A relates to threatened species conservation.

There are no threatened species listed under the Act which are mapped as occurring in proximity to the site[4], or likely to occur in proximity to the site.

No marine vegetation or threatened marine fauna would be directly impacted by the proposal.

[4] Fisheries NSW Spatial Data Portal https://webmap.industry.nsw.gov.au/Html5Viewer/index.html?viewer=Fisheries_Data_Portal

The two first-order (Strahler), minor watercourses within the site occur generally as broad, shallow swales which merge in the north-western portion of the site and follow the railway line to the west toward Broughton Creek, over 1.5 km from the site. A section of the eastern watercourse immediately north of Beach Rd contains a small defined, ephemeral channel, but no permanent watercourse channel occurs within or in close proximity to the site.

Connectivity to Broughton Creek appears to be via overland flow and shallow, grassed, poorly defined swales, offering substantial filtration.

Two small, artificial ponds occur along the eastern watercourse's northern alignment, with depths of 0.5 m and 1.0 m are likely to be semi-permanent.

The proposal would not impact directly on either watercourse or the ponds. Buffers, sediment erosion controls and stabilisation of disturbed soil would be implemented as safeguards to minimised the risk of indirect impacts on the watercourses and water quality.

The proposal is therefore unlikely to result in indirect impacts which would affect threatened aquatic species or their habitats.

Further consideration of Parts 1 through 6 of the NSW DPI Threatened species assessment criteria, which considers impacts to threatened species, habitat of threatened species, and endangered ecological communities listed under the Act, is not warranted.

As demonstrated in Table 2 below (Part 7 of NSW DPI Threatened species assessment criteria), the proposal would not contribute significantly to key threatening processes, as listed under Part 7A of the Act.

It is concluded that the proposal is unlikely to result in any impact on threatened entities or their habitat; or contribute significantly to key threatening processes, as listed under Part 7A of the Act.

The proposed activity therefore does not require an Environmental Impact Statement (EIS) or Species Impact Statement (SIS) under the Act.

Table 2. Fisheries Management Act – Key Threatening Process Assessment

Key Threatening Process	Assessment
Degradation of native riparian vegetation along NSW water courses	Negligible – the proposal would not impact directly on any riparian corridor. Vegetated buffers – generally from 30 to 50 m wide would be retained to the two first order streams in the site. At its narrowest point, where the Stage 2 site adjoins the Stage 1 - Area A and the buffer is approx. 15 m to 20 m wide, which still exceeds a suitable riparian buffer (10m) for a first order stream.
Hook and line fishing in areas important for the survival on threatened fish species	Not applicable – proposal does not comprise or facilitate hook and line fishing.
Human-caused climate change	Not applicable – the proposal does not contribute to human-cause climate change.
Installation and operation of instream structures and other mechanisms that alter natural flow regimes of rivers and streams	Not applicable – the proposal does not involve the installation and operation of instream structures or other mechanisms that alter natural flow regimes of rivers and streams.

Key Threatening Process	Assessment
Introduction of fish to waters within a river catchment outside their range	Not applicable – the proposal does not involve releasing fish.
Introduction of non-indigenous fish and marine vegetation to the coastal waters of NSW	Not applicable – the proposal does not involve the introduction of non-indigenous fish.
Removal of large woody debris from NSW rivers and streams	Not applicable – the proposal does not involve the removal of woody debris.
The current shark meshing program in NSW waters	Not applicable – the proposal does not involve shark meshing.

3.2.2 Part 7 *Biodiversity Conservation Act 2016*

An assessment of the potential for NSW threatened flora and fauna species occurring on-site or otherwise being impacted by the proposal was undertaken (Appendix B). The following threatened species or endangered ecological communities are known to occur on-site or are considered to have some potential to occur on-site or be otherwise impacted by the proposal:

- *Artamus cyanopterus cyanopterus* Dusky Woodswallow
- *Callocephalon fimbriatum* Gang-gang Cockatoo
- *Hieraaetus morphnoides* Little Eagle
- *Glossopsitta pusilla* Little Lorikeet
- *Tyto novaehollandiae* Masked Owl
- *Petroica rodinogaster* Pink Robin
- *Ninox strenua* Powerful Owl
- *Anthochaera phrygia* Regent Honeyeater
- *Petroica boodang* Scarlet Robin
- *Lophoictinia isura* Square-Tailed Kite
- *Lathamus discolor* Swift Parrot
- *Daphoenositta chrysoptera* Varied Sittella
- *Pteropus poliocephalus* Grey-headed Flying-fox
- *Micronomus norfolkensis* Eastern Coastal Free-tailed Bat
- *Falsistrellus tasmaniensis* Eastern False Pipistrelle
- *Scoteanax rueppellii* Greater Broad-nosed Bat
- *Miniopterus orianae oceanensis* Large Bent-winged Bat
- *Myotis macropus* Southern Myotis
- *Saccolaimus flaviventris* Yellow-bellied Sheathtail-bat
- *Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions*

Section 7.3 of the Act provides a 'five-part' test to determine whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. Each Part is addressed below:

Part A - In the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be place at risk of extinction.

Small to medium sized forest birds: Regent Honeyeater, Dusky Woodswallow, Varied Sittella, Scarlet Robin and Pink Robin

The Regent Honeyeater (*Anthochaera phrygia*) is a striking and distinctive, medium-sized, black and yellow honeyeater with a sturdy, curved bill. This species is considered a flagship threatened woodland bird whose conservation would benefit a large suite of other threatened and declining woodland fauna. The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. Birds are also found in drier coastal woodlands and forests in some years. There are three known key breeding areas, two of them in NSW - Capertee Valley and Bundarra-Barraba regions. In NSW the distribution is very patchy and mainly confined to the two main breeding areas and surrounding fragmented woodlands. In some years flocks converge on flowering coastal woodlands and forests. The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River She-oak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. Every few years non-breeding flocks are seen foraging in flowering coastal Swamp Mahogany and Spotted Gum forests, particularly on the central coast and occasionally on the upper north coast. Birds are occasionally seen on the south coast. The Regent Honeyeater is a generalist forager, although it feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar. Key eucalypt species include Mugga Ironbark, Yellow Box, White Box and Swamp Mahogany. Other tree species may be regionally important. For example, the Lower Hunter Spotted Gum forests have recently been demonstrated to support regular breeding events. Flowering of associated species such as Thin-leaved Stringybark *Eucalyptus eugenioides* and other Stringybark species, and Broad-leaved Ironbark *E. fibrosa* can also contribute important nectar flows at times. Nectar and fruit from the mistletoes *Amyema miquelii*, *A. pendula* and *A. cambagei* are also utilised. When nectar is scarce lerp and honeydew can comprise a large proportion of the diet. Insects make up about 15% of the total diet and are important components of the diet of nestlings. The species breeds between July and January in Box-Ironbark and other temperate woodlands and riparian gallery forest dominated by River Sheoak. Regent Honeyeaters usually nest in horizontal branches or forks in tall mature eucalypts and Sheoaks. Also nest in mistletoe haustoria (roots). An open cup-shaped nest is constructed of bark, grass, twigs and wool by the female (OEH 2022f).

The Dusky Woodswallow (*Artamus cyanopterus cyanopterus*) medium-sized bird (16-19.5 cm), mostly dark grey-brown with a merging to blackish on its longish tail. The species is widespread in eastern, southern and south-western Australia, occurring throughout most of New South Wales, but is sparsely scattered in, or largely absent from, much of the upper western region. Most breeding activity occurs on the western slopes of the Great Dividing Range. The Dusky Woodswallow primarily inhabits dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest, also being found in farmland, usually at the edges of forest or woodland. The species primarily eats invertebrates, mainly insects, which are captured whilst hovering or sallying above the canopy or over water and occasionally will take nectar, fruit and seed. It also frequently hovers, sallies and pounces under the canopy, primarily over leaf litter and dead timber. Depending on location and local climatic conditions (primarily temperature and rainfall), the Dusky Woodswallow can be a year-round resident or migratory. In NSW, after breeding, birds migrate to the north of the state and to south-eastern Queensland, while Tasmanian birds migrate to south-eastern NSW after breeding. Migrants generally depart between March and May, heading south to breed again in spring. There

is some evidence of site fidelity for breeding. Although Dusky Woodswallows generally breed as solitary pairs or occasionally in small flocks, large flocks may form around abundant food sources in winter. Large flocks may also form before migration, which is often undertaken with other species. The species nests in an open, cup-shape nest, made of twigs, grass, fibrous rootlets and occasionally casuarina needles, and may be lined with grass, rootlets or infrequently horsehair, occasionally unlined. Nest sites vary greatly, but generally occur in shrubs or low trees, living or dead, horizontal or upright forks in branches, spouts, hollow stumps or logs, behind loose bark or in a hollow in the top of a wooden fence post. Nest sites may be exposed or well concealed by foliage (OEH 2017e).

The Varied Sittella (*Daphoenositta chrysoptera*) is a small (10cm) and highly mobile treecreeper with a sharp, slightly upturned bill, short tail, barred undertail, and yellow eyes and feet. Varied Sittellas are more active and acrobatic among branches than the larger treecreepers. They fly into the heads of trees, typically working their way down branches and trunk with constant motion. The species inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. It feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees and small branches and twigs in the tree canopy. It builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years (OEH 2017e).

The Scarlet Robin (*Petroica boodang*) is a small Australian robin that reaches 13 cm in length. The male has a bright scarlet-red chest, with a conspicuous white forehead patch, white belly, white wing stripes and white tail-edges. The female is pale brown, darker above, and has a dull reddish breast and whitish throat. The Scarlet Robin is found from south east Queensland to south east South Australia and also in Tasmania and south west Western Australia. In NSW, it occurs from the coast to the inland slopes. After breeding, some Scarlet Robins disperse to the lower valleys and plains of the tablelands and slopes. Some birds may appear as far west as the eastern edges of the inland plains in autumn and winter. The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. The Scarlet Robin breeds on ridges, hills and foothills of the western slopes, the Great Dividing Range and eastern coastal regions; this species is occasionally found up to 1000 metres in altitude. The Scarlet Robin is primarily a resident in forests and woodlands, but some adults and young birds disperse to more open habitats after breeding. In autumn and winter many Scarlet Robins live in open grassy woodlands, and grasslands or grazed paddocks with scattered trees. The Scarlet Robin is a quiet and unobtrusive species which is often quite tame and easily approached. Birds forage from low perches, fence-posts or on the ground, from where they pounce on small insects and other invertebrates which are taken from the ground, or off tree trunks and logs; they sometimes forage in the shrub or canopy layer. Scarlet Robin pairs defend a breeding territory and mainly breed between the months of July and January; they may raise two or three broods in each season. This species' nest is an open cup made of plant fibres and cobwebs and is built in the fork of tree usually more than 2 metres above the ground; nests are often found in a dead branch in a live tree, or in a dead tree or shrub. In autumn and winter, the Scarlet Robin joins mixed flocks of other small insectivorous birds which forage through dry forests and woodlands (OEH 2017d).

Pink Robin (*Petroica rodinogaster*) is a small, forest dwelling bird which inhabits rainforest and tall, open eucalypt forest, particularly in densely vegetated gullies. The male Pink Robin has a sooty black throat and upperparts. The wings have faint, tan-buff wing-bars. The breast and belly are deep lilac-pink, and there is a small white patch on the forehead. The tail is plain, making this

species the only 'red' robin with no white markings on the tail. It differs from the similar, and more common Rose Robin *Petroica rosea*, which is dark grey above, with a deeper rose-pink breast and white belly, and white outer tail feathers. The female has warm olive-brown upperparts and cinnamon-buff underparts, a buff forehead spot, and may have a slight pink wash on the breast. The chestnut-buff wings and the absence of white in the tail, distinguishes the female from all other female robins. The Pink Robin is found in Tasmania and the uplands of eastern Victoria and far south-eastern NSW, almost as far north as Bombala. On the mainland, the species disperses north and west and into more open habitats in winter, regularly as far north as the ACT area, and sometimes being found as far north as the central coast of NSW. The species catches prey by the perch-and-pounce method, foraging more on the ground than the more flycatcher-like Rose Robin. Insects and spiders are the main dietary items. Pink Robin breeds between October and January and can produce two clutches in a season. The nest is a deep, spherical cup made of green moss bound with cobweb and adorned with camouflaging lichen, and is lined with fur and plant down. It is situated in an upright or oblique fork, from 30cm to 6m above the ground, in deep undergrowth. Females do most or all of the nest building and incubate unaided, but both adults feed the nestlings. The most common call most closely resembles a snapping twig (OEH 2023).

The footprint of the current Stage 2 proposal would occur within historically disturbed land, containing no large mature trees and with an understorey of dense Lantana infestation.

The area that would be impacted on does not contain suitable foraging or nesting habitat for these forest bird species, such as: significantly large, mature Eucalypt trees with dead branches and rough or decorticating bark; high canopy cover; mistletoes; open and sparse or grassy understorey.

Areas within the subject site that contain potentially suitable habitat and preferred tree species for feeding or foraging on insects (including Swamp Mahogany for Regent Honeyeater), would be retained and protected.

Vegetated movement corridors suitable for these species would be retained across the site to the north and south of the Stage 2 footprint.

It is therefore considered unlikely that Regent Honeyeater, Dusky Woodswallow, Varied Sittella, Scarlet Robin or Pink Robin would be impacted by the proposed works, and the proposed activity is unlikely to have an adverse effect on the lifecycle of these species such that a viable local population of any of these species is likely to be placed at risk of extinction.

<u>Cockatoos and parrots: Gang-gang Cockatoo, Little Lorikeet and Swift Parrot</u>

The Gang-gang Cockatoo (*Callocephalon fimbriatum*) is generally found in tall mountain forests and woodlands in spring and summer, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas. May also occur in sub-alpine Snow Gum (*Eucalyptus pauciflora*) woodland and occasionally in temperate rainforests. Gang-gang Cockatoo favours old growth forest and woodland attributes for nesting and roosting. Breeding is generally from Oct-Jan (OEH 2022b). Nests are located in hollows that are 10 cm in diameter or larger and at least 9 m above the ground in eucalypts. Nesting hollows are usually vertical or points steeply upward (Morcombe 2004).

The Little Lorikeet (*Glossopsitta pusilla*) forages primarily in the canopy of open Eucalypt forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Isolated

flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species. The species feeds mostly on nectar and pollen, occasionally on native fruits such as mistletoe, and only rarely in orchards. The Little Lorikeet is gregarious, travelling and feeding in small flocks (<10), though often with other lorikeets. Flocks numbering hundreds are still occasionally observed and may have been the norm in past centuries. The species roosts in treetops, often distant from feeding areas. Nests are in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts. Entrance is small (3 cm) and usually high above the ground (2–15 m). These nest sites are often used repeatedly for decades, suggesting that preferred sites are limited. Riparian trees often chosen, including species like Allocasuarina. The nesting season extends from May to September. In years when flowering is prolific, Little Lorikeet pairs can breed twice, producing 3-4 young per attempt. However, the survival rate of fledglings is unknown (OEH 2022d).

The Swift Parrot (*Lathamus discolor*) is small parrot about 25 cm long. This species breeds in Tasmania during spring and summer, migrating in the autumn and winter months to south-eastern Australia from Victoria and the eastern parts of South Australia to south-east Queensland. In NSW it mostly occurs on the coast and south west slopes. It migrates to the Australian south-east mainland between February and October. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifera*, Forest Red Gum *E. tereticornis*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*. Commonly used lerp infested trees include Inland Grey Box *E. microcarpa*, Grey Box *E. moluccana*, Blackbutt *E. pilularis*, and Yellow Box *E. melliodora*. The Swift Parrot returns to some foraging sites on a cyclic basis depending on food availability. Following winter they return to Tasmania where they breed from September to January, nesting in old trees with hollows and feeding in forests dominated by Tasmanian Blue Gum *Eucalyptus globulus* (OEH 2022h).

The footprint of the current Stage 2 proposal would occur within historically disturbed land, containing no large mature trees and with an understorey of dense Lantana infestation. No hollow-bearing trees occur within the area that would be impacted.

The area that would be impacted does not contain suitable foraging or nesting habitat for these cockatoo and parrot species, such as: tall Eucalypt forest or woodland; large, mature, flowering Eucalypt trees of preferred species (such as Swamp Mahogany or Blackbutt).

Areas within the subject site that contain potentially suitable habitat and preferred tree species for feeding (including riparian corridors for Little Lorikeet and Swamp Mahogany and Blackbutt trees for Swift Parrot), would be retained and protected.

Vegetated movement corridors suitable for these species would be retained across the site to the north and south of the Stage 2 footprint.

It is therefore considered unlikely that Gang-gang Cockatoo, Little Lorikeet or Swift Parrot would be impacted by the proposed works, and the proposed activity is unlikely to have an adverse effect on the lifecycle of these species such that a viable local population of any of these species is likely to be placed at risk of extinction.

<u>Raptors: Little Eagle and Square-Tailed Kite</u>

The Little Eagle is a medium-sized bird of prey that occurs in two colour forms: either pale brown with an obscure underwing pattern, or dark brown on the upper parts and pale underneath, with a rusty head and a distinctive underwing pattern of rufous leading edge, pale ‘M’ marking and black-

barred wingtips. Both forms have a black-streaked head with a slight crest, a pale shoulder band on the upper wings, a rather short and square-tipped barred tail, and feathered legs. The Little Eagle is found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. It occurs as a single population throughout NSW. This species occupies open eucalypt forest, woodland or open woodland. She-oak or Acacia woodlands and riparian woodlands of interior NSW are also used. The Little Eagle nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter, laying two or three eggs during spring, with young fledging in early summer. It preys on birds, reptiles and mammals, occasionally adding large insects and carrion (OEH 2021).

The Square-tailed Kite is a reddish, medium-sized, long-winged raptor 50-56cm long and with wingspan 130-145cm. A key character in flight is the long fingered, upswept wings with a large white patch at the base of the barred 'fingers'. In NSW, scattered records of the species throughout the state indicate that the species is a regular resident in the north, north-east and along the major west-flowing river systems. It is a summer breeding migrant to the south-east, including the NSW south coast, arriving in September and leaving by March. Breeding is from July to February, with nest sites generally located along or near watercourses, in a fork or on large horizontal limbs. The Square-tailed Kite is found in a variety of timbered habitats including dry woodlands and open forests, showing a particular preference for timbered watercourses. It appears to occupy large hunting ranges of more than 100km2. In arid north-western NSW, it has been observed in stony country with a ground cover of chenopods and grasses, open acacia scrub and patches of low open eucalypt woodland. This raptor is a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy, picking most prey items from the outer foliage (OEH 2022g).

The footprint of the current Stage 2 proposal would occur within historically disturbed land, containing no large mature trees and with an understorey of dense Lantana infestation.

The area that would be impacted does not contain suitable foraging or nesting habitat for these raptor species, such as: tall Eucalypt forest, woodland or timbered watercourses, with large, mature trees for nesting.

Areas within the subject site that contain potentially suitable habitat, such as tall, remnant forest, would be retained and protected.

Vegetated movement corridors suitable for these species would be retained across the site to the north and south of the Stage 2 footprint.

It is therefore considered unlikely that Little Eagle or Square-tailed Kite would be impacted by the proposed works, and the proposed activity is unlikely to have an adverse effect on the lifecycle of these species such that a viable local population of any of these species is likely to be placed at risk of extinction.

Large forest owls: Powerful Owl and Masked Owl

The Powerful Owl (*Ninox strenua*) inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. The species requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine *Syncarpia glomulifera*, Black She-oak *Allocasuarina littoralis*, Blackwood *Acacia melanoxylon*, Rough-barked Apple *Angophora floribunda*, Cherry Ballart *Exocarpus cupressiformis* and a number of eucalypt species. The main prey items are medium-sized arboreal marsupials, particularly the Greater Glider,

Common Ringtail Possum and Sugar Glider. There may be marked regional differences in the prey taken by Powerful Owls. For example, in southern NSW, Ringtail Possum make up the bulk of prey in the lowland or coastal habitat. At higher elevations, such as the tableland forests, the Greater Glider may constitute almost all of the prey for a pair of Powerful Owls. Flying foxes are important prey in some areas; birds comprise about 10-50% of the diet depending on the availability of preferred mammals. As most prey species require hollows and a shrub layer, these are important habitat components for the owl. Pairs of Powerful Owls demonstrate high fidelity to a large territory, the size of which varies with habitat quality and thus prey densities. In good habitats a mere 400 ha can support a pair; where hollow trees and prey have been depleted the owls need up to 4000 ha. Powerful Owls nest in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old. While the female and young are in the nest hollow the male Powerful Owl roosts nearby (10-200 m) guarding them, often choosing a dense "grove" of trees that provide concealment from other birds that harass him. Powerful Owls are monogamous and mate for life. Nesting occurs from late autumn to mid-winter (generally May-Aug), but is slightly earlier in north-eastern NSW (late summer - mid autumn). Clutches consist of two dull white eggs and incubation lasts approximately 38 days (OEH 2022e).

The Masked Owl (*Tyto novaehollandiae*) is a medium-sized owl to 40 - 50 cm long, with dark eyes set in a prominent flat, heart-shaped facial disc that is encircled by a dark border. It lives in dry eucalypt forests and woodlands from sea level to 1100 m. The species is a forest owl, but often hunts along the edges of forests, including roadsides. The species' typical diet consists of tree-dwelling and ground mammals, especially rats. Breeding pairs have a large home-range of up to 1000 hectares or more. Roosts and breeds from May-Aug in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting (OEH 2017c).

The footprint of the current Stage 2 proposal would occur within historically disturbed land, containing no large mature trees and with an understorey of dense Lantana infestation. No hollow-bearing trees suitable for large forest owls occur within or in proximity to the Stage 2 footprint.

The area that would be impacted does not contain suitable foraging habitat for these owl species, such as open forest or woodland.

Areas within the subject site that contain potentially suitable foraging habitat would be retained and protected.

Vegetated movement corridors suitable for these species would be retained across the site to the north and south of the Stage 2 footprint.

It is therefore considered unlikely that Powerful Owl or Masked Owl would be impacted by the proposed works, and the proposed activity is unlikely to have an adverse effect on the lifecycle of these species such that a viable local population of any of these species is likely to be placed at risk of extinction.

<u>Microchiropteran Bats*:* Eastern Coastal Freetail Bat, Eastern False Pipistrelle, Greater Broad-nosed Bat, Large (Eastern) Bent-wing-bat, Southern Myotis and Yellow-bellied Sheathtail Bat</u>

Eastern Coastal Freetail-Bat (*Micronomus norfolkensis*) occurs in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. The species roosts mainly in tree hollows but will also roost under bark or in man-made structures. It will usually change breeding sites regularly (every few days), rendering it very difficult to confirm breeding sites. It has been known to occasionally aggregate in large breeding groups (including in buildings). It is usually solitary but has also been recorded roosting communally. The Eastern Freetail-Bat is considered to probably be insectivorous (OEH 2022a).

Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) prefers moist habitats, with trees taller than 20 m. Generally the species roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings, however roost requirements poorly known. Hunts beetles, moths, weevils and other flying insects above or just below the tree canopy. Hibernates in winter. Females are pregnant in late spring to early summer (OEH 2017b).

Greater Broad-nosed Bat (*Scoteanax rueppellii*) utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings. The species forages after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 - 6 m. Open woodland habitat and dry open forest suits the direct flight of this species as it searches for beetles and other large, slow-flying insects; this species has been known to eat other bat species. Little is known of its reproductive cycle, however, a single young is born in January; prior to birth, females congregate at maternity sites located in suitable trees, where they appear to exclude males during the birth and raising of the single young (OEH 2022c).

Southern Myotis (*Myotis macropus*) generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. The species is dependent on waterways with pools of 3m wide or greater for foraging, with habitat surrounding the waterways (usually within 200m) being used for breeding and roosting. The species will forage over streams and pools catching insects and small fish by raking their feet across the water surface. In NSW females have one young each year usually in November or December (OEH 2020b).

Large (Eastern) Bentwing-bat (*Miniopterus orianae oceanensis*) roosts primarily in caves, but it also uses derelict mines, storm-water tunnels, buildings and other man-made structures. The species forms discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. Maternity caves have very specific temperature and humidity regimes. At other times of the year, populations disperse within about 300 km range of maternity caves. Cold caves are used for hibernation in southern Australia. Breeding or roosting colonies can number from 100 to 150,000 individuals. The species hunts in forested areas, catching moths and other flying insects above the tree tops (OEH 2019).

Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*) roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, it flies high and fast over the forest canopy, but lower in more open country. The species forages in most habitats across its very wide range, with and without trees and appears to defend an aerial territory. Breeding has been recorded from December to mid-March, when a single young is born. Seasonal movements of the species are unknown; there is speculation about a migration to southern Australia in late summer and autumn (OEH 2022i).

Microbat young are typically born around November-December, with weaning around the following January-February (Richards & Hall 2012).

No habitat suitable for microbat breeding or roosting including hollow-bearing trees, mature trees with decorticating bark or caves occur within the Stage 2 footprint.

The vegetation over the Stage 2 site may provide sub-optimal foraging habitat for these microbats, however, more optimal habitat occurs and would be retained through the higher condition vegetated areas of the site, as well as nearby areas of vegetation including the Harley Hill Cemetery land, Moeyan Hill, Coomonderry Swamp and Seven Mile Beach National Park.

Impact on potential foraging habitat for microbat species would therefore be negligible in the context of the surrounding habitat.

Works would occur during standard construction hours, so would not impact on the primarily nocturnal feeding periods of this species.

The proposal would not result in any barrier to movement for these species.

It is therefore considered unlikely that East Coast Freetail Bat, Eastern False Pipistrelle, Greater Broad-nosed Bat, Large (Eastern) Bent-wing-bat, Southern Myotis and Yellow-bellied Sheathtail Bat would be impacted by the proposed works, and the proposed activity is unlikely to have an adverse effect on the lifecycle of these species such that a viable local population of any of these species is likely to be placed at risk of extinction.

Grey-headed Flying-fox *Pteropus poliocephalus*

The Grey-headed Flying-fox (GHFF) is the largest Australian bat, with a head and body length of 23 - 29 cm. It has dark grey fur on the body, lighter grey fur on the head and a russet collar encircling the neck. The wing membranes are black and the wingspan can be up to 1 m. It can be distinguished from other flying-foxes by the leg fur, which extends to the ankle. Grey-headed Flying-foxes are generally found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. In times of natural resource shortages, they may be found in unusual locations. This species occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Individual camps may have tens of thousands of animals and are used for mating, and for giving birth and rearing young. Annual mating commences in January and conception occurs in April or May; a single young is born in October or November. Site fidelity to camps is high; some camps have been used for over a century. GHFF can travel up to 50 km from the camp to forage; commuting distances are more often <20 km. They feed on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines, also foraging in cultivated gardens and fruit crops (2020a).

No GHFF camp exists in close proximity to the site, the nearest being at Broughton Mill Creek approx. 2.7 km to the west of the subject site[5].

The vegetation over the Stage 2 site may provide sub-optimal foraging habitat for Grey-headed Flying-fox (i.e. flowering Eucalypt trees), however, more optimal habitat occurs and would be retained through the higher condition vegetated areas of the site, as well as nearby areas of vegetation including the Harley Hill Cemetery land, Moeyan Hill, Coomonderry Swamp and Seven Mile Beach National Park. The species is far-ranging and would not rely on food sources within the Stage 2 footprint.

Impact on potential foraging habitat for this species would therefore be negligible in the context of the surrounding habitat.

Works would occur during standard construction hours, so would not impact on the primarily nocturnal feeding periods of this species.

The proposal would not result in any barrier to movement for this species.

It is therefore considered unlikely that Grey-headed Flying-fox would be impacted by the proposed works, and the proposed activity is unlikely to have an adverse effect on the lifecycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

[5] Source: http://www.environment.gov.au/webgis-framework/apps/ffc-wide/ffc-wide.jsf

Part B - In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

Vegetation along the western riparian corridor within the site features *Eucalyptus robusta* (Swamp Mahogany) with *Glochidion ferdinandi* (Cheese Tree) as a frequent understorey tree, and groundcover dominated by sedges including *Carex appressa* (Carex), *Carex longebrachiata* (Carex), *Carex maculata* (Carex) and *Gahnia sieberiana* (Red-fruited Saw-sedge).

This vegetation aligns with PCT4009 (Shoalhaven Lowland Flats Wet Swamp Forest) and is considered to be consistent with Swamp Sclerophyll Forest TEC. Refer to Section 2.3 for more information.

<u>Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions</u>

Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions (SSF) is the name given to the ecological community associated with humic clay loams and sandy loams, on waterlogged or periodically inundated alluvial flats and drainage lines associated with coastal floodplains (NSW Scientific Committee 2011).

SSF generally occurs below 20 m (though sometimes up to 50 m) elevation, often on small floodplains or where the larger floodplains adjoin lithic substrates or coastal sand plains in the NSW North Coast, Sydney Basin and South East Corner bioregions (NSW Scientific Committee 2011).

This swamp community has an open to dense tree layer of eucalypts and paperbarks although some remnants now only have scattered trees as a result of partial clearing. The trees may exceed 25 m in height, but can be considerably shorter in regrowth stands or under conditions of lower site quality where the tree stratum is low and dense. For example, stands dominated by *Melaleuca ericifolia* typically do not exceed 8 m in height. The community also includes some areas of fernland and tall reedland or sedgeland, where trees are very sparse or absent (NSW Scientific Committee 2011).

The most widespread and abundant dominant trees include *Eucalyptus robusta* (Swamp Mahogany), *Melaleuca quinquenervia* (Paperbark) and, south from Sydney, *Eucalyptus botryoides* (Bangalay) and *Eucalyptus longifolia* (Woollybutt). Other trees may be scattered throughout at low abundance or may be locally common at few sites, including *Callistemon salignus* (Sweet Willow Bottlebrush), *Casuarina glauca* (Swamp She-oak) and *Eucalyptus resinifera* subsp. *hemilampra* (Red Mahogany), *Livistona australis* (Cabbage Palm) and *Lophostemon suaveolens* (Swamp Turpentine). A layer of small trees may be present, including *Acacia irrorata* (Green Wattle), *Acmena smithii* (Lilly Pilly), *Elaeocarpus reticulatus* (Blueberry Ash), *Glochidion ferdinandi* (Cheese Tree), *Melaleuca linariifolia* and *M. styphelioides* (Paperbarks). Shrubs include *Acacia longifolia, Dodonaea triquetra, Ficus coronata, Leptospermum polygalifolium* subsp. *polygalifolium* and *Melaleuca* spp. Occasional vines include *Parsonsia straminea, Morinda jasminoides* and *Stephania japonica* var. *discolor*. The groundcover is composed of abundant sedges, ferns, forbs, and grasses including *Gahnia clarkei, Pteridium esculentum, Hypolepis muelleri, Calochlaena*

dubia, Dianella caerulea, Viola hederacea, Lomandra longifolia, Entolasia marginata and *Imperata cylindrica* (NSW Scientific Committee 2011).

Approximately 2.04 ha of vegetation consistent with PCT4009 (Shoalhaven Lowland Flats Wet Swamp Forest) was mapped during investigations within the subject site (refer to Figure 8 in section 2.3) and is considered to be consistent with SSF.

The proposal would involve removal of approx. 2.58 ha of disturbed, low condition native vegetation, predominantly identified as PCT3154 (Illawarra Blackbutt Moist Forest) consisting of scattered, young trees (to approx. 20 cm DBH, with no hollows) and an understorey which is predominantly exotic Lantana.

The proposed Stage 2 footprint would occur adjacent to the western riparian corridor containing mapped SSF (PCT4009) and would encroach marginally within the understorey of the mapped SSF (up to approx. 350 m^2), but would avoid impact on any canopy trees associated with the EEC. The canopy extent of trees associated with the EEC including Swamp Mahogany and Cheese Tree, would be used to delineate the boundary of the Stage 2 footprint to prevent impact on the EEC.

The area to be cleared would be delineated prior to vegetation removal to prevent encroachment into higher condition vegetation to be retained and protected.

Where encroachment into the understorey of mapped SSF would occur, the vegetation is predominantly exotic Lantana infestation. The proposal would involve removal of the Lantana and the establishment of a 3.0 m wide, low vegetated buffer comprised of native sedges and grasses with sediment controls (silt fence and coir logs as appropriate). The encroachment would therefore enhance, rather than impact on the EEC. The buffer would also assist in filtration of any surface water flow from the stockpile site which is not directed to the sediment basin.

A Soil and Water Management Plan (SWMP) would be developed to ensure appropriate staging, controls and mitigation measures are implemented to reduce risks associated with surface water flow, erosion and sediment movement.

Internal drainage shall be incorporated into the stockpile depot design which includes: diversion banks above stockpile areas; drainage between stockpile areas containing filtration and energy dissipation; and a permanent sediment basin which would release above the EEC in the north-west of the Stage 2 footprint, consistent with the existing general direction of surface water flow.

Landform and hydrology would therefore be modified through an area of land to the immediate east of the EEC, however, this represents only a small portion of the catchment of the western watercourse that the EEC is associated with; the proposal would not involve restriction or alteration of stormwater flow along this watercourse; and discharge of surface water from the Stage 2 footprint would ultimately be directed into the same area as existing. Effects on soil moisture and the frequency of waterlogging where the EEC occurs, as a result of the proposal, would therefore be minimal.

It is therefore unlikely that the proposal would result in sediment movement or changes to hydrology which would impact on the EEC.

The proposal would not result in the fragmentation or isolation of areas of any EEC and is unlikely to adversely affect the extent or composition of any EEC such that a local occurrence of the EEC would be placed at risk of extinction.

Part C - In relation to the habitat of a threatened species or ecological community:

(iii)the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity

(iv)whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

(v) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality.

No important habitat for threatened species would be removed or otherwise significantly impacted (see Part A).

No EEC would not be fragmented or isolated, nor removed or modified to an extent that would affect the long-term survival of the EEC occurring in the locality (refer to Part B).

The proposal will therefore not affect the long-term survival of any threatened species or endangered ecological community in the locality.

Part D – Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

No "*areas of outstanding biodiversity values"* have been declared in the City of Shoalhaven.

Part E – Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

Key threatening processes listed in the NSW *Biodiversity Conservation Act 2016* considered relevant to the proposed activity include:

- Clearing native vegetation
- Alteration to the natural flow regimes of rivers, streams, floodplains and wetlands

Clearing of native vegetation is listed as a key threatening process, defined by the Scientific Committee's determination (OEH 2021) as:

> *"the destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation so as to result in the loss, or long-term modification, of the structure, composition and ecological function of a stand or stands."*

Clearing of native vegetation has been shown to:

- cause widespread fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity;
- lead to soil and bank erosion, increased salinity and loss of productive land.

The proposal would involve removal of approx. 2.58 ha of disturbed, low condition native vegetation consisting of scattered, young trees (to approx. 20 cm DBH, with no hollows) and an understorey which is predominantly exotic Lantana.

The footprint of the proposal was determined after comprehensive vegetation assessment, to be situated in an area of low-quality vegetation (i.e. disturbed and lacking important habitat features and characteristics), with suitable buffers, safeguards and mitigation measures to minimise the risk

of impacts on watercourses and other sensitive environments, and without fragmenting vegetation or fauna movement corridors. Refer to sections 2.1 and 3.2.2 for more information.

The impact of the proposal with regard to clearing of native vegetation, is not considered to be significant as it is unlikely to lead to:

- destruction of habitat causing a loss of biological diversity and extinction of species or loss or local genotypes
- fragmentation of populations resulting in limited gene flow between small, isolated populations, reduced potential to adapt to environmental change and loss or severe modification of the interactions between species
- riparian zone degradation such as bank erosion leading to sedimentation that affects aquatic communities – the riparian corridor would be stabilised as a result of the works.
- disturbance of habitat which may permit the establishment and spread of exotic species which may displace native species
- loss of leaf litter, removing habitat for a wide variety of vertebrates and invertebrates.
- significant reduction of habitat for threatened species or ecological communities.

Alteration to the natural flow regimes of rivers, streams, floodplains and wetlands is noted in the Scientific Committee's determination (OEH 2021) as occurring through:

> *"reducing or increasing flows, altering seasonality of flows, changing the frequency, duration, magnitude, timing, predictability and variability of flow events, altering surface and subsurface water levels and changing the rate of rise or fall of water levels".*

Landform and hydrology would be modified in proximity to a first order watercourse, however, the proposal would not involve restriction or alteration of stormwater flow along this watercourse; and discharge of surface water from the Stage 2 footprint would ultimately be directed into the same area as existing. The proposal would therefore not result in any alteration to flow regimes.

3.3 Threatened species impact assessment (Commonwealth EPBC Act 1999)

A Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Report was generated on 8th January 2024. Of those threatened species and endangered ecological communities reported as likely occurring or having habitat within the area of the report, the following were considered to have potential habitat within the site requiring further assessment:

- Blackfaced Monarch *Monarcha melanopsis* (M)
- Gang-gang Cockatoo *Callocephalon fimbriatum* (E)
- Regent Honeyeater *Anthochaera phrygia* (CE)
- Swift Parrot *Lathamus discolor* (CE)
- Grey-headed Flying-fox *Pteropus poliocephalus* (V)
- *Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland* (E)

(CE – Critically Endangered; E – Endangered; V – Vulnerable; M – Migratory).

Refer also to Likelihood of Occurrence Table in Appendix B.

Additional species listed under the Act, including migratory birds, may occur occasionally and transiently within the vicinity of the proposed activity but would not be affected by the proposal.

A significant impact assessment of EPBC listed threatened entities was undertaken in Table 3.

Table 3. EPBC Significant impact assessment

Vulnerable species - Significant impact criteria Species to consider: • **Grey-headed Flying-fox (GHFF)**	
Criteria	***Assessment***
Lead to a long-term decrease in the size of an important population of a species.	The proposed activity will not directly impact on a known local population of GGBF, will not affect or disrupt breeding, will not impact on breeding habitat, and will have only a negligible impact on potential foraging and refuge habitat. Refer to Section 3.2.2 for more information.
Reduce the area of occupancy of an important population.	No
Fragment an existing important population into two or more populations.	No
Adversely affect habitat critical to the survival of a species.	No important habitat for this species will be impacted by the proposed activity. No breeding, and only very minimal potential foraging or refuge habitat for GHFF would be impacted. Refer to Section 3.2.2 for more information.
Disrupt the breeding cycle of an important population.	Works would not affect breeding habitat. Refer above and to Section 3.2.2 for more information.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	No important habitat will be impacted by the proposed activity. Refer to Section 3.2.2 for more information.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.	No invasive species will be introduced
Introduce disease that may cause the species to decline.	No disease will be introduced
Interfere substantially with the recovery of the species.	No
Critically endangered and endangered species - Significant impact criteria Species to consider: • **Gang-gang Cockatoo** • **Regent Honeyeater** • **Swift Parrot**	
Criteria	
Lead to a long-term decrease in the size of a population.	The proposed activity will not directly impact on a known local population of Gang-gang Cockatoo, Regent Honeyeater or Swift Parrot, will not affect or disrupt breeding or impact on breeding habitat of these species,

	and will not impact on potential movement corridors. Refer to Section 3.2.2 for more information.
Reduce the area of occupancy of the species.	No
Fragment an existing population into two or more populations.	No
Adversely affect habitat critical to the survival of a species.	No critical habitat for these species will be impacted by the proposed activity. Refer to Section 3.2.2 for more information.
Disrupt the breeding cycle of a population.	Works would not affect breeding habitat. Refer above and to Section 3.2.2 for more information.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	No important habitat will be impacted by the proposed activity. Refer to Section 3.2.2 for more information.
Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat.	No invasive species will be introduced.
Introduce disease that may cause the species to decline.	No disease will be introduced.
Interfere with the recovery of the species.	No

Critically endangered and endangered ecological communities - Significant impact criteria

Communities to consider:

- **Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland (CSSF)**

Criteria	***Assessment***
Reduce the extent of an ecological community.	The proposed Stage 2 footprint would occur adjacent to the western riparian corridor containing mapped CSSF (PCT4009) and would encroach marginally within the understorey of the mapped CSSF (up to approx. 350 m^2), but would avoid impact on any canopy trees associated with the EEC. Where encroachment into the understorey of mapped CSSF would occur, the vegetation is predominantly exotic Lantana infestation. The proposal would involve removal of the Lantana and the establishment of a 3.0 m wide, low vegetated buffer comprised of endemic sedges and grasses. The encroachment would therefore enhance, rather than impact on the EEC. The proposed vegetation removal would therefore not reduce the 'extent' of the EEC, would not fragment and would not affect the recovery or increase the likelihood of extinction of the EEC. Refer to section 3.2.2 for more information.

Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines.	No. See above.
Adversely affect habitat critical to the survival of an ecological community.	
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns.	Landform and hydrology would be modified over an area of land to the immediate east of the EEC, however, this represents only a small portion of the catchment of the western watercourse that the EEC is associated with; the proposal would not involve restriction or alteration of stormwater flow along this watercourse; and discharge of surface water from the Stage 2 footprint would ultimately be directed into the same area as existing. Effects on soil moisture and the frequency of waterlogging where the EEC occurs, as a result of the proposal, would therefore be minimal. Refer to section 3.2.2 for more information.
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting.	No. See above.
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: Assisting invasive species, that are harmful to the listed ecological community, to become established, or causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community.	No. The proposal would not introduce or promote the growth of invasive species or other impacts which would affect the integrity or occurrence of the EEC.
Interfere with the recovery of an ecological community.	No
Summary	The proposal would not impact directly on CSSF and would not introduce impacts that would negatively affect species composition, vegetation integrity or occurrence of the EEC. It is therefore considered unlikely that the proposal would adversely affect the extent or composition of *Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland* such that a local occurrence of the EEC will be placed at risk of extinction.
Listed migratory species - Significant impact criteria Species to consider:	

- **Black Faced Monarch**

Species overview:

Black-faced Monarch is a small to medium-sized (16-20 cm) passerine bird. It is a wet forest specialist, found mainly in rainforest and wet sclerophyll forest along the east-coast of Australia.

The species occurs mainly in rainforest ecosystems, including selectively logged and 20—30 years old regrowth rainforest, and is sometimes found in nearby open eucalypt forests (mainly wet sclerophyll forests). It is known to occur in 'marginal' habitats during winter or during passage (migration).

It forages for insects and arthropods at all vertical levels of the forest, though most often at low or middle levels, within 6 m of the ground.

Black-faced monarch breeds in rainforest from October to March, with eggs recorded mostly from November to mid-January, generally with nests near the top of trees with large leaves, in the tops of small saplings, or in lower shrubs.

The movements of the Black-faced Monarch are poorly known, however they exhibit migratory behaviour, spending spring, summer and autumn in eastern Australia, and wintering in southern and eastern Papua New Guinea from March to August.

(DCCEEW 2023)

Invasive species considered to be a threat to Black-faced Monarch include Black Rat (*Rattus rattus*) and invasive vines of riparian habitat (e.g. rubber vine Cryptostegia grandiflora)

The number of individuals of Black-faced Monarch considered to represent a nationally significant proportion of the population is 460.

The number of individuals of Black-faced Monarch which if impacted on is considered to result in a significant impact is 47.

The area threshold of important habitat considered to result in a nationally significant impact on Black-faced Monarch if affected is 260 ha.

(DoE 2015)

Criteria	***Assessment***
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species.	No. Vegetation that would be removed or modified as a result of the proposal is low condition, disturbed vegetation and does not constitute important habitat for Black Faced Monarch. Moderate to high condition vegetation within the subject site would be retained and protected.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species.	No. The proposal would not result in the establishment or promotion of any invasive species.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	No. An individual Black Faced Monarch was observed within the western riparian corridor on the subject site once. The subject site does not contain habitat which is used by or otherwise important to an ecologically significant proportion of the species.

Conclusion of EPBC Significant Impact Assessment

The proposal is unlikely to have an adverse effect on a vulnerable, endangered, critically endangered or migratory species or its habitat, nor on the extent or integrity of an endangered ecological community such that its local occurrence is likely to be placed at risk of extinction.

No other matters of significance, i.e.:

- Ramsar wetlands of international importance;
- Commonwealth marine environment;
- world heritage properties;
- national heritage places;
- the Great Barrier Reef Marine Park;
- nuclear actions; or
- a water resource, in relation to coal seam gas development and large coal mining development;

would be affected as a result of the proposed activity.

Further assessment and referral to the Commonwealth is therefore not required.

3.4 Indigenous heritage

Under Section 86 of the NSW *National Parks and Wildlife Act 1974* (NPW Act) it is an offence to disturb, damage, or destroy any Aboriginal object without an Aboriginal Heritage Impact Permit (AHIP). The Act, however, provides that if a person who exercises 'due diligence' in determining that their actions will not harm Aboriginal objects has a defence against prosecution if they later unknowingly harm an object without an AHIP (Section 87(2) of the Act). To effect this, the NSW Department of Environment, Climate Change and Water have prepared the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wale*s (hereafter referred to as the 'Due Diligence Guidelines) to assist individuals and organisations to exercise due diligence when carrying out activities that may harm Aboriginal objects and to determine whether they should apply for an AHIP.

Landscape features that are regarded as indicating a higher potential for Aboriginal objects, as outlined in the NSW Department of Environment, Climate Change and Water's Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales (2010) include:

- within 200m of waters, or
- located within a sand dune system, or
- located on a ridge top, ridge line or headland, or
- located within 200m below or above a cliff face, or
- within 20m of or in a cave, rock shelter, or a cave mouth.

The site contains minor ephemeral watercourses which appear to be influenced by development of the land, including the elevated railway line to the north of the site and construction of drainage along Beach Rd. No naturally occurring permanent or semi-permanent waterways occur, nor any other landscape features which indicate a higher potential for Aboriginal objects.

A search on the Aboriginal Heritage Information Management System (AHIMS) on 13th December 2023 indicated that there are no recorded Aboriginal sites within or in proximity to the subject site (refer to Figure 10 below).

Figure 10. AHIMS search results

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : Beach Rd Stockpile2
Client Service ID : 848572

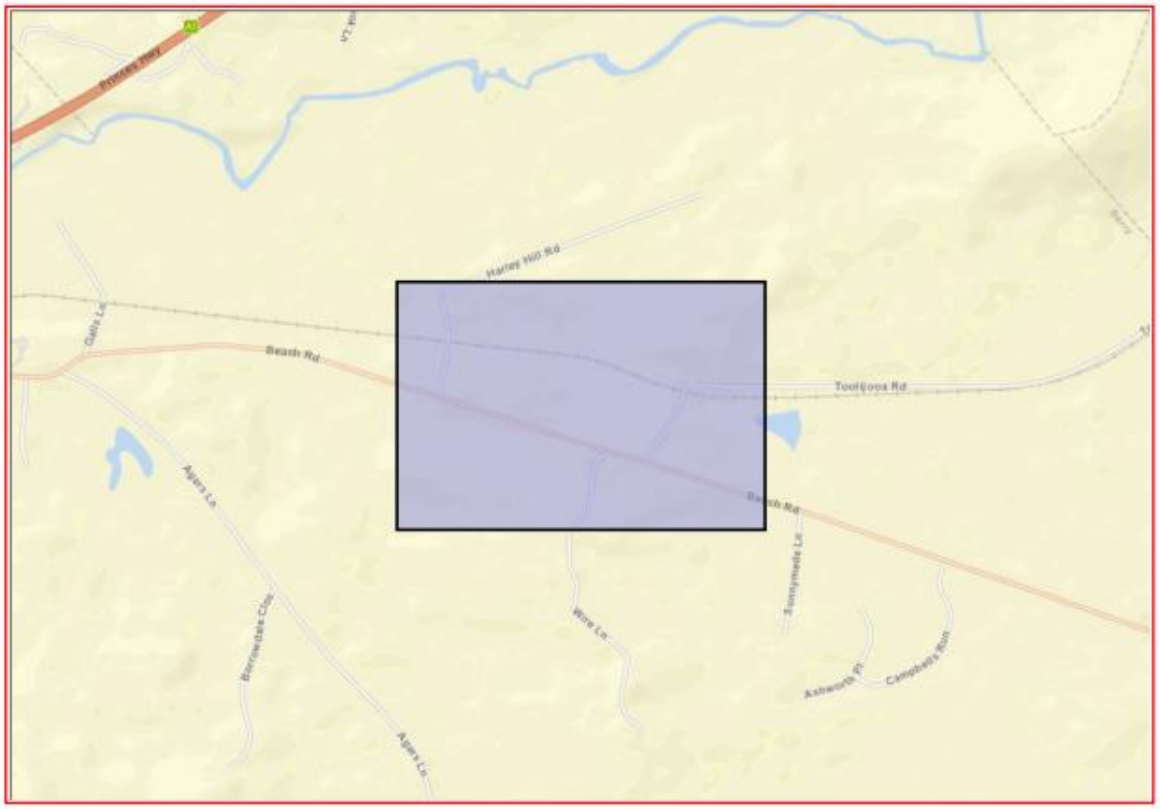
Shoalhaven City Council
42 Bridge Road
Nowra New South Wales 2541
Attention: Jeff Bryant
Email: jeff.bryant@shoalhaven.nsw.gov.au

Date: 13 December 2023

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lat, Long From : -34.7825, 150.7294 - Lat, Long To : -34.7737, 150.7449, conducted by Jeff Bryant on 13 December 2023.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

No potential Aboriginal heritage objects were observed within the site during investigations, noting that visibility and access was limited through much of the Stage 2 footprint due to dense Lantana infestation.

The Due Diligence Guidelines define disturbed land as follows:

"Land is disturbed if it has been the subject of a human activity that has changed the land's surface, being changes that remain clear and observable. Examples include ploughing, construction of rural infrastructure (such as dams and fences), construction of roads, trails and tracks (including fire trails and tracks and walking tracks), clearing vegetation, construction of buildings and the erection of other structures, construction or installation of utilities and other similar services (such as above or below ground electrical infrastructure, water or sewerage pipelines, stormwater drainage and other similar infrastructure) and construction of earthworks."

The site of the proposed activity is disturbed as a result of past clearing of the land – as evidenced by the young age class of trees, lack of species diversity and high density of invasive weed infestation.

As the proposal would occur on disturbed land and would not impact any recorded Aboriginal sites or places, the Due Diligence Guidelines requires no further assessment, an AHIP is not required, and the activity can proceed with caution.

3.5 Non-indigenous heritage

A heritage listing exists on the NSW Heritage Register for Harley Hill Cemetery (NSW Heritage ID: 2390142) (Figure 11). No other heritage items are recorded in proximity to the site of the proposed activity.

Harley Hill Cemetery is a large cemetery lying between Beach Road and the Illawarra Railway Line of 1893, with denomination areas and family plots scattered through forested areas.

The cemetery is considered to have local significance with historical and social value as the second cemetery for Berry, containing the graves of many noticeable citizens, and with mason skills adding some aesthetic interest[6].

Harley Hill Cemetery is entirely contained within Lot 1 DP 723973, to the immediate west of the subject site (Lot B DP 185785).

The proposed activity would occur at least 130 m from Lot 1 DP 723973, with no indirect impacts likely that might affect off-site locations.

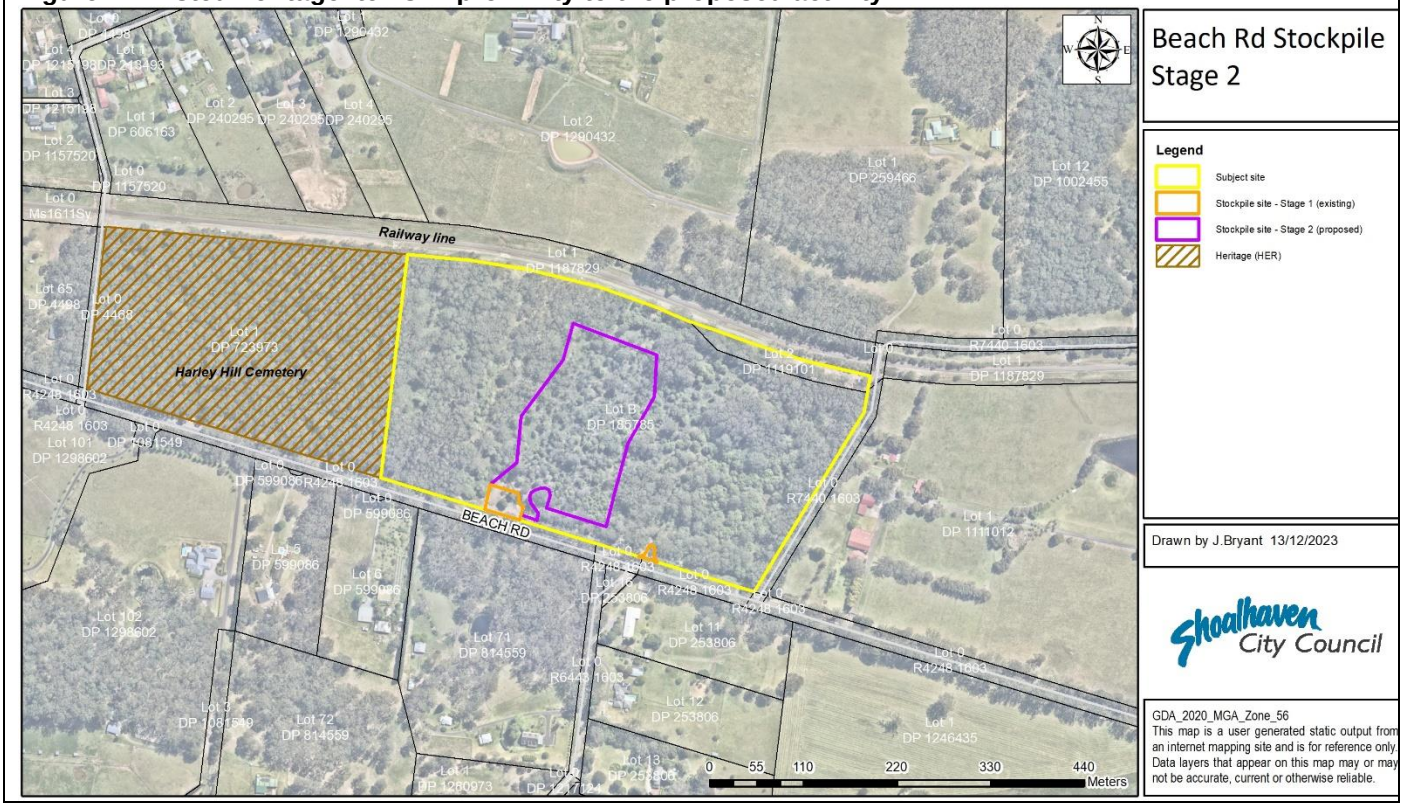
No potential heritage objects were observed within the site during investigations, noting that visibility and access was limited through much of the Stage 2 footprint due to dense Lantana infestation.

It is therefore concluded that the proposal would not result in any impacts on heritage items or values associated with Harley Hill Cemetery and works can be undertaken with caution.

In the event that any relics are found during works, notification to NSW Heritage Council is required under s146 of the *Heritage Act 1977.*

[6] Source: NSW State Heritage Inventory: https://www.hms.heritage.nsw.gov.au/App/Item/ViewItem?itemId=2390142

Figure 11. Listed heritage items in proximity to the proposed activity



3.6 Riparian corridors, Key Fish Habitat & Water quality

Impacts on riparian corridors, Key Fish Habitat (KFH) and water quality were considered with regard to the following:

- Likely and potential impacts on vegetation, stability or function of riparian corridors as a result of construction activities.
- Sediment movement into waterways as a result of construction and ongoing operational activities.

Riparian corridors

The proposal would not impact directly on any riparian corridor. Vegetated buffers – generally from 30 to 50 m wide would be retained to the two first order streams in the site. At its narrowest point, where the Stage 2 site adjoins the Stage 1 - Area A, a buffer to the western watercourse of approx. 15 m to 20 m wide would be retained, which exceeds a suitable riparian buffer (10m) for a first order stream. An additional 3.0 m buffer would be created around the perimeter of the Stage 2 footprint.

Landform and hydrology would be modified in proximity to the western watercourse (first order), however, the proposal would not involve restriction or alteration of stormwater flow along this watercourse; and discharge of surface water from the Stage 2 footprint would ultimately be directed into the same area as existing. The proposal would therefore not result in any alteration to flow regimes which may impact on the riparian corridor.

A Soil and Water Management Plan (SWMP) would be developed to ensure appropriate staging, controls and mitigation measures are implemented to reduce risks associated with surface water flow, erosion and sediment movement.

Disturbed soil would be stabilised following works and revegetation would be undertaken in proximity to the riparian corridor.

The proposal would not impact on the function or integrity of the riparian corridor.

The proposal would therefore not result in significant impacts on riparian corridors.

It is therefore concluded that impacts on riparian corridors, resulting from the proposal, would be minimal and mitigations would further reduce immediate and long-term impacts.

Water Quality

Two first-order (Strahler), minor, ephemeral watercourses occur within the site generally as broad, shallow swales which merge in the north-western portion of the site and follow the railway line to the west toward Broughton Creek. No permanent watercourse channel occurs within or in close proximity to the site.

Connectivity to Broughton Creek, over 1.5 km from the site, appears to be via overland flow and shallow, grassed, poorly defined swales, offering substantial filtration.

Two small, artificial ponds occur along the eastern watercourse's northern alignment, with depths of 0.5 m and 1.0 m are likely to be semi-permanent. The smaller pond occurs approximately 35.0 m to the north of the Stage 2 footprint and the large pond occurs approximately 120.0 m to the east of the Stage 2 footprint.

The proposal would not impact directly on either watercourse or the ponds.

Landform and hydrology would be modified in proximity to a first order watercourse, however, the proposal would not involve restriction or alteration of stormwater flow along this watercourse; and discharge of surface water from the Stage 2 footprint would ultimately be directed into the same area as existing. The proposal would therefore not result in any alteration to flow regimes.

A Soil and Water Management Plan (SWMP) would be developed to ensure appropriate staging, controls and mitigation measures are implemented to reduce risks associated with surface water flow, erosion and sediment movement.

Acid sulfate soils are unlikely to be disturbed as a result of proposed works (refer to section 2.2 and section 3.8).

It is therefore concluded that sediment movement and the risk of impact on water quality, resulting from the proposal, would be minimal and mitigations would further reduce immediate and long-term impacts.

Key Fish Habitat

No Key Fish Habitat (KFH) is mapped as occurring within or in close proximity to the subject site. KFH is mapped as occurring in association with Broughton Creek and its major tributaries, over 1 km downstream to the north-west of the minor watercourses within the subject site (Refer to Figure 12 below).

No direct impacts on KFH would occur as a result of the proposal.

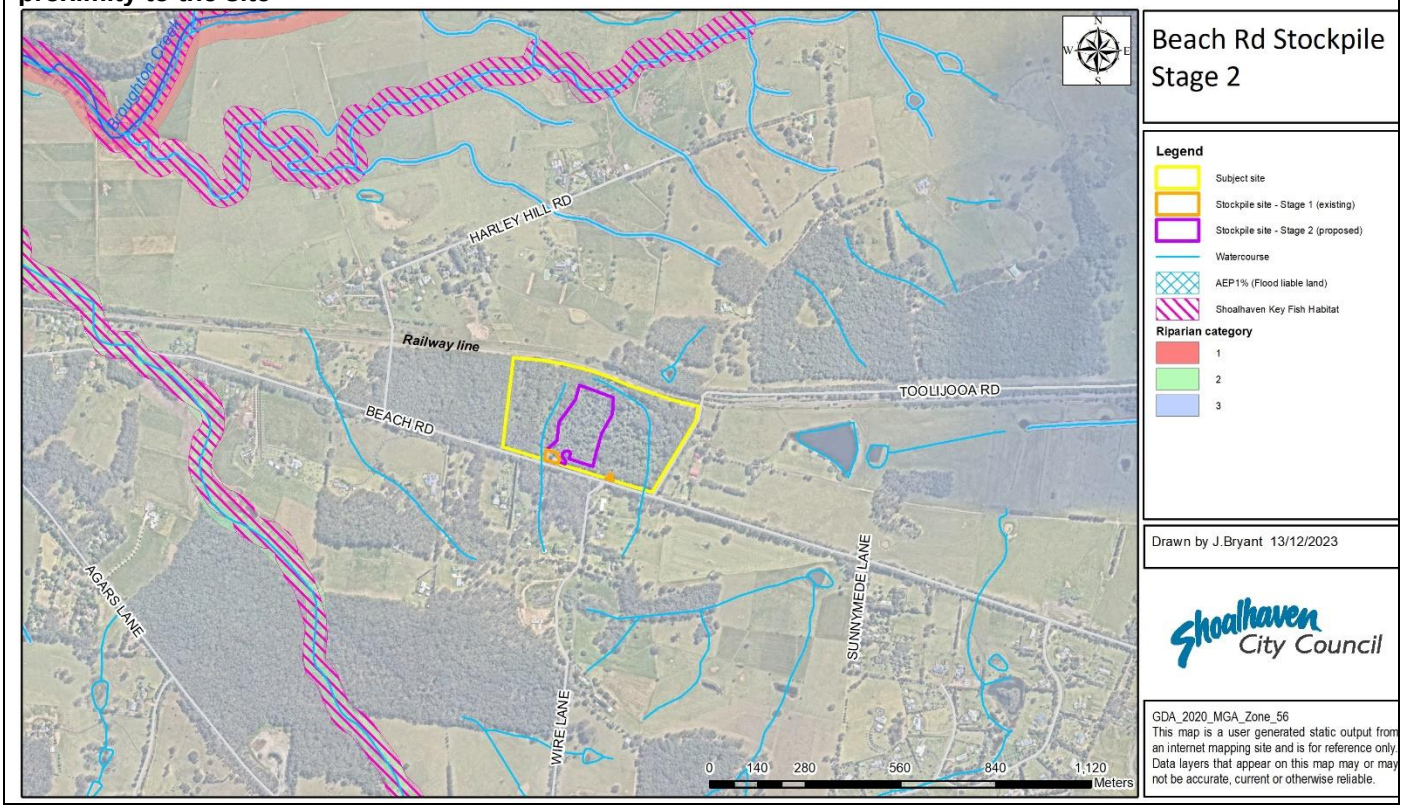
No permanent waterways occur within or in proximity to the site.

Indirect impacts associated with sediment movement are unlikely to impact on KFH. The design and staging of works in accordance with a SWMP, with provision for stabilisation and erosion and

sediment controls and the inclusion of a permanent sediment basin would minimise the risk of sediment movement downstream of the stockpile depot (refer to section 3.1 and section 7 for more information). The land between the stockpile depot and the nearest defined watercourse downstream, is relatively flat and extensively covered with pasture grass, providing substantial filtration and would further reduce the risk of sediment impact on waterways as a result of the proposal.

Aquatic habitat would therefore not be impacted by the proposal.

Figure 12. Flood liable land, riparian corridors and Key Fish Habitat (KFH) mapped as occurring in proximity to the site



3.7 Flood liable land

The subject site is not mapped as being flood liable land and no mapped flood liable land occurs in proximity to the site (refer to Figure 12 above).

The proposal would not restrict or alter stormwater flow along the watercourses within the site and would not alter flow regimes, so would therefore not negatively affect flood behaviour.

Stage 1 of the stockpile depot involved construction and stabilisation of an elevated platform (approx. 2.0 m above the watercourse) and the establishment of a vegetated buffer to the western watercourse with erosion and sediment controls.

Stage 2 of the stockpile depot would continue parallel to the western watercourse, but with a larger vegetated buffer to the watercourse (generally 30 – 50 m), while retaining elevation above the watercourse to minimise risks associated with high flows and localised flooding.

3.8 Acid Sulfate Soil

Acid sulfate soils (A.S.S) are the common name given to sediments and soils containing iron sulfides which, when exposed to oxygen generate sulfuric acid. The majority of acid sulfate sediments were formed by natural processes in the Holocene geological period (the last 10,000 years). Formation conditions require the presence of iron-rich sediments, sulfate (usually from seawater), removal of reaction products such as bicarbonate, the presence of sulfate reducing bacteria and a plentiful supply of organic matter. These conditions tend to exist in mangroves, salt marsh vegetation or tidal areas, and at the bottom of coastal rivers and lakes. The relatively specific conditions under which acid sulfate soils are formed usually limit their occurrence to low lying parts of coastal floodplains, rivers and creeks. This includes areas with saline or brackish water such as deltas, coastal flats, backswamps and seasonal or permanent freshwater swamps that were formerly brackish. Due to flooding and stormwater erosion, these sulfidic sediments may continue to be re-distributed through the sands and sediments of the estuarine floodplain region. Sulfidic sediment may be found at any depth in suitable coastal sediments – usually beneath the watertable (ASSMAC 1998).

The subject site and surrounds are mapped as Class 5 A.S.S. Refer to section 2.2 of this REF.

The *Shoalhaven Local Environment Plan 2014* indicates that a risk of exposure of A.S.S exists for Class 5 A.S.S where works would occur within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum and by which the watertable is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land.

Class 4 A.S.S. is mapped as occurring approximately 700 m to the west of the proposed Stage 2 footprint and Class 3 A.S.S. is mapped as occurring approximately 1 km to the east of the proposed Stage 2 footprint.

The proposed activity would not involve works within 500 m of adjacent Class 1, 2, 3 or 4 land and furthermore, would not involve, or result in, any lowering of the watertable.

No risk of exposure of A.S.S would therefore result from the proposed activity.

3.9 Other considerations

In the context of this environmental assessment, the area to be affected by the proposed activity:

- is not an Aboriginal Place in the context of the NSW National Parks and Wildlife Act 1974, nor is it known to contain Aboriginal artefacts
- is not mapped as “potentially contaminated land”

3.10 EP&A Regulation – Section 171 matters of consideration

Section 171(2) of the *Environmental Planning and Assessment Regulation 2021* lists the factors to be taken into account when consideration is being given to the likely impact of an activity on the environment under Part 5 of the EP&A Act. These matters are addressed in Table 4.

Table 4. Section 171 Matters of consideration

Does the proposal:	Assessment	Reason
a) Have any environmental	Positive	The proposed activity is anticipated to facilitate improved practice and greater sustainability in waste management

impact on a community?		and resource recovery associated with Council's construction and maintenance activities. The proposal would not have any impact on other community services and infrastructure such as power, water and waste-water, educational, medical or social services.
b) Cause any transformation of a locality?	Positive	The site's historic use has involved practices considered inappropriate by current standards, including in some locations, the dumping of material haphazardly into intact vegetation, against trees and in close proximity to watercourses without controls, safeguards or records. The proposal seeks to implement appropriate practices and reduce potential risks to the environment on the site by establishing areas with buffers and mitigation measures to protect sensitive environmental features and systems to ensure appropriate management of waste material. The siting of the Stage 2 footprint and retention and enhancement of vegetated screens would minimise impacts on visual amenity and intrusive sound and vibration associated with the proposal.
c) Have any environmental impact on the ecosystem of the locality?	Low adverse	The five-part test of significance (Section 3.2) concludes that the proposed activity would not have a significant impact upon threatened species or endangered ecological communities. The proposal has been situated in existing disturbed areas of low condition vegetation, with buffers to retained vegetation and watercourses, and retained connectivity of vegetation to accommodate continued fauna movement. No food or habitat resources critical to the survival of a particular species would be removed. No changes to flow regimes are likely to occur. Aquatic ecosystems are not likely to be affected by the proposed activity and there is not likely to be any long-term or long-lasting impact through the input of sediment and nutrient into the ecosystem. A Soil and Water Management Plan (SWMP) would be developed to ensure appropriate staging, controls and mitigation measures are implemented to reduce risks associated with surface water flow, erosion and sediment movement. Refer to prescribed environmental safeguards and mitigation measures (Section 7).
d) Cause a diminution of the aesthetic, recreational, scientific or other	Low adverse	The proposal has been situated to retain and utilise existing vegetation as screening to minimise aesthetic impacts of the proposal.

environmental quality or value of a locality?		Vegetated screens along Beach Rd would be enhanced to further reduce impacts on visual amenity. The site has historically been utilised for uncontrolled stockpiling and dumping. The proposal would formalise and manage stockpiling appropriately and would discourage dumping. In the context of the locality, the visual impact of the proposal is therefore considered to be minimal. The site has no recreational value and minimal scientific value. The proposed activity would have no substantial impacts on the environmental qualities of the site (refer to sections 3.1, 3.2, 3.3 and 3.6 of this REF).
e) Have any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific, or social significance or other special value for present or future generations?	Negligible	The site of the proposed activity has no significant aesthetic, architectural, cultural, historical, scientific or social values. No items in the vicinity of the work site which are listed on the State Heritage Register and the Shoalhaven Local environmental Plan would be impacted by the proposal (refer to Section 3.5). The site is not within an Aboriginal Place declared under the National Parks and Wildlife Act 1974. In accordance with the NSW Department of Environment, Climate Change and Water's Due Diligence Code of Practice, the proposed activity does not require an Aboriginal Heritage Impact Permit as the activity is unlikely to harm an Aboriginal artefact (refer to Section 3.4).
f) Have any impact on the habitat of protected fauna (within the meaning of the Biodiversity Conservation Act 2016)?	Low adverse	The proposal has been situated in existing disturbed areas of low condition vegetation, with buffers to retained vegetation and watercourses, and retained connectivity of vegetation to accommodate continued fauna movement. If encountered, removal of burrows or other habitat would involve inspection and exclusion / relocation protocols prior to removal, to ensure there are no direct impacts on fauna. Medium to high quality vegetation and habitat with connectivity would be retained around the proposal to support resident and future fauna. (refer to Sections 3.1 and 3.2 of this REF for more information). The prescribed environmental safeguards and mitigation measures (Section 7) would mitigate indirect impacts to fauna and habitat.
g) Cause any endangering of any species of animal, plant or other form of life,	Negligible	The five-part test of significance, provided in Section 3.2 above, concludes that the proposed activity would not have a significant impact upon threatened fauna. No threatened species are likely to rely on habitat that would be impacted on as a result of the proposal.

whether living on land, in water or in the air?		No indirect impacts to threatened species are likely to result from the proposal. The prescribed environmental safeguards and mitigation measures (Section 7) would minimise the risk of impact to resident fauna including threatened microbat species.
h) Have any long-term effects on the environment?	Low-adverse	Noise generated during establishment and operation of the stockpile depot would occur during normal working hours. Waste material received at the stockpile depot would be from activities associated primarily with construction and maintenance of roads. Material which is known to be hazardous or restricted would not be received at the stockpile depot. Storing, testing, sorting and reuse (or disposal) of material would be in accordance with relevant EPA Resource and Recovery Orders and Exemptions. This practice shall ensure that the proposed stockpile activities do not generate chemicals which may build up harmful residues in the local environment. The possible impacts have been discussed in detail under Section 3. Refer also to the prescribed environmental safeguards and mitigation measures in Section 7.
i) Cause any degradation of the quality of the environment?	Low-adverse	Aquatic ecosystems are not likely to be affected by the proposed activity and there is not likely to be any long-term or long-lasting impact through the input of sediment and nutrient into the ecosystem. A Soil and Water Management Plan (SWMP) would be developed and implemented to ensure appropriate staging, controls and mitigation measures are implemented to reduce risks associated with surface water flow, erosion and sediment movement. The proposal would not intentionally introduce noxious weeds, vermin, or feral animals into the area or contaminate the soil. It is anticipated that appropriate stockpile management practices involving testing, sorting, reuse (or off-site disposal) in accordance with RRE's, would minimise risk of environmental degradation. Environmental safeguards and mitigation measures (Section 7) would be employed to minimise risk of impacts.
j) Cause any risk to the safety of the environment?	Low-adverse	The proposed activity would not involve hazardous wastes (refer to (h) above) and would not lead to increased bushfire or landslip risks.
k) Cause any reduction in the range of beneficial uses of the environment?	Low adverse	The proposal has been situated in existing disturbed areas of low condition vegetation, with buffers to retained vegetation and watercourses, and retained connectivity of vegetation to accommodate continued fauna movement.

		The proposed activity is anticipated to facilitate improved practice and greater sustainability in waste management and resource recovery associated with Council's construction and maintenance activities. The proposal seeks to implement appropriate practices and reduce potential risks to the environment on the site by establishing areas with buffers and mitigation measures to protect sensitive environmental features and systems to ensure appropriate management of waste material. No permanent fixtures are currently planned, but the proposal would involve the construction or installation of storage sheds.
l) Cause any pollution of the environment?	Low adverse	Noise generated by vehicles and machinery during establishment and operation of the site would occur during normal working hours and would not affect any sensitive receivers such as residential areas, schools, childcare centres and hospitals. Minor sediment disturbance may result from works, but this is anticipated to be minimal and would be captured and managed during works and operations and stabilised following works. Sediment and erosion control in accordance with the Blue Book will be implemented to minimise movement of sediment into waterways. It is unlikely that the activity (including the environmental impact mitigation measures) would result in water or air pollution, spillages, dust, odours, vibration or radiation. The risk of contamination and spills from machinery including fuel and hydraulic fluids would be minimised through safeguards and mitigation measures (Section 7).
m) Have any environmental problems associated with the disposal of waste?	Positive	The proposal would enable the temporary storage of construction materials and components, in addition to the storage, testing, sorting and reuse of construction and maintenance waste material in accordance with relevant NSW EPA Resource Recovery Exemptions (RRE's). This would facilitate improved practice and greater sustainability in waste management and resource recovery associated with Council's construction and maintenance activities. There would be no trackable waste, hazardous waste, liquid waste, or restricted solid waste as described in the NSW *Protection of the Environment Operations Act 1997*.
n) Cause any increased demands on resources (natural or otherwise)	Positive	The proposal would facilitate improved practice and greater sustainability in waste management and resource recovery associated with Council's construction and maintenance activities. Resource demand and associated

which are, or are likely to become, in short supply?		costs associated with these activities would thereby be reduced.
o) Have any cumulative environmental effect with other existing or likely future activities?	Low adverse	The currently proposed Stage 2 of Beach Rd Stockpile Depot would be an extension of the established Stage 1 proposal. Stage 2 would involve further vegetation clearing and potential for sediment erosion. Like Stage 1, Stage 2 is proposed to be situated in existing, disturbed areas to minimise impacts on the environment, and would retain and protect surrounding vegetation and habitat of higher condition and value. Prescribed environmental safeguards and mitigation measures (Section 7) shall be implemented to minimise the risk of cumulative environmental effects. No further development of the site is proposed.
p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions	Negligible	The proposed activity would have no effect on coastal processes including those projected under climate change conditions. The site is not located in a coastal hazard area.
q) Any applicable local strategic planning statement, regional strategic plan or district strategic plan made under Division 3.1 of the Act	Positive	The proposed activity is consistent with the *Shoalhaven 2040* Strategic Land-use Planning Statement, including Planning Priority 12 *Managing Resources* https://doc.shoalhaven.nsw.gov.au/displaydoc.aspx?record=D20/437277 . The activity is not inconsistent with the Illawarra Shoalhaven Regional Plan 2041 https://www.planning.nsw.gov.au/-/media/Files/DPE/Plans-and-policies/Plans-for-your-area/Regional-plans/Illawarra-Shoalhaven-Regional-Plan-05-21.pdf The site is mapped as “habitat corridor” on the Regional Environmental Plan, but the proposal has been designed and situated to minimise impacts on the use and function of the habitat corridor.
r) Any other relevant environmental factors	N/A	

4. PERMISSIBILITY

4.1 Environmental Planning & Assessment Act 1979

Section 4.1 (Development that does not need consent) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) states that:

> *"If an environmental planning instrument provides that specified development may be carried out without the need for development consent, a person may carry the development out, in accordance with the instrument, on land to which the provision applies."*

In this regard, section 2.67 of the NSW *State Environmental Planning Policy (Transport and Infrastructure) 2021* (Transport & Infrastructure SEPP) provides that:

> *"Development for any purpose referred to in section 2.73(3) may be carried out without consent on operational land by or on behalf of a council."*

Section 2.73(3) Transport & Infrastructure SEPP provides that (underline added for emphasis):

> *"Any of the following development may be carried out by or on behalf of a council without consent on a public reserve under the control of or vested in the council—*
> *(a) development for any of the following purposes—*
> *(i) roads, pedestrian pathways, cycleways, single storey car parks, ticketing facilities, viewing platforms and pedestrian bridges,*
> *…*
> *(viii) maintenance depots,*
> *…*
> *(b) environmental management works,*
> *…"*

Note that under the Standard Instrument, "depot" means: *a building or place used for the storage (but not sale or hire) of plant, machinery or other goods (that support the operations of an existing undertaking) when not required for use, but does not include a farm building.*

As the proposal does not require development consent, and as it constitutes an 'activity' for the purposes of Part 5 of the EP&A Act, being carried out by (or on behalf of) a public authority, environmental assessment under Part 5 of the EP&A Act is required. This REF provides this assessment and ensures that Council as determining authority in consideration of the activity, meets its obligation under s5.5 of the EP&A Act, to examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

4.2 Biodiversity Conservation Act 2016

The proposed development complies with the *Biodiversity Conservation Act 2016* for the following reasons:

- The proposed activity is unlikely to have a significant impact on threatened species and/or threatened ecological communities listed in the schedules of the Act. There is, therefore, no requirement to 'opt in' to the Biodiversity Offset Scheme.
- The design and mitigation measures (Section 7 of this REF) would ensure that no *serious and irreversible impacts on biodiversity values* (as defined by the BC Act) occur at the site of the proposed activity.
- The proposed activity is not within an area declared to be of "outstanding biodiversity value" as defined in the Act and Regulations.

Because of the above considerations, neither a species impact statement nor a biodiversity development assessment report is required for the proposed activity.

It is also a defence to a prosecution for an offence under Part 2 of the Act (harming animals, picking plants, damaging the habitat of threatened species or ecological communities *etc*) if the work was essential for the carrying out of an activity by a determining authority within the meaning of Part 5 of the Environmental Planning and Assessment Act 1979 after compliance with that Part.

The activity will not remove vegetation that is listed under Schedule 1 Threatened Species, Schedule 2 Threatened ecological communities and Schedule 6 Protected Plants. Therefore, the activity is considered permissible as this REF has been prepared and determined in accordance with the EP&A Act.

Refer to Section 3.2 for more information.

4.3 Protection of the Environment Operations Act 1997

The proposed development of the Stage 2 stockpile depot footprint would involve the application of waste soil material to the land (in addition to earth moving of the existing ground) to level and stabilise stockpile areas, and would involve the application of reclaimed asphalt pavement and recovered aggregate to the land for construction and stabilisation of internal access roads.

The ongoing operation of the Beach Rd Stockpile Depot would involve the temporary storage of construction materials and components, in addition to the temporary storage, testing and sorting of construction and maintenance waste material for reuse in road construction or landscaping activities, or for disposal (off-site to a licenced waste facility) where required. Treatment of contaminated soil involving aerobic bioremediation of hydrocarbon-contamination would occur where appropriate.

The stockpile depot would not be utilised as a waste disposal facility; no extractive activities would be carried out on the site; and no hazardous (as defined by the POEO Act) or trackable wastes (as defined by the Waste Regulation) would be stored or processed at the stockpile depot.

Waste material received at the stockpile depot would include:

- Excavated road pavement originating from public roads in maintenance and reconstruction activities and may contain asphalt, subbase soil and aggregate.
- Excavated soil material originating from various maintenance activities including from road shoulders and verges (e.g. excavation for road widening); drainage channels (e.g. excavation for construction of drainage or maintenance removal of sediment from road-side table drains or stormwater channels); creeks (maintenance removal of deposited sediment and / or cobbles obstructing culverts).
- Limited vegetation material may be received including trees felled or pruned for construction and maintenance purposes; woody material removed to clear culvert obstructions; leaf litter removed from drainage channels (usually this would not be separated from soil).

Waste material would therefore be of varying type and quality and where originating from – or adjacent to – roads, may contain contaminants including petroleum hydrocarbons.

The storage and / or application to land of waste is administered by the *Protection of the Environment Operations Act 1997* (POEO Act).

Scheduled activities are listed in Schedule 1 of the POEO Act. The undertaking of a scheduled activity or the operation of scheduled waste facility requires an Environmental Protection Licence (EPL) under the POEO Act.

Clause 92 of the *Protection of the Environment Operations (Waste) Regulation 2014* ("Waste Regulation") provides for exemptions relating to resource recovery, including waste that is applied – or is intended to be applied – to land as follows:

(i) by spraying, spreading or depositing it on the land,

(ii) by ploughing, injecting or mixing it into the land,

(iii) by filling, raising, reclaiming or contouring the land.

Current exemptions and their associated orders are published on the NSW Environment Protection Authority (EPA) website: https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/resource-recovery-framework/current-orders-and-exemption .

The following exemptions may be applicable to the reuse of waste material generated in typical construction and maintenance works carried out by SCC:

- The Excavated Natural Material Exemption 2014 http://www.epa.nsw.gov.au/resources/waste/rre14-excavated-natural-material.pdf
- The Excavated Public Road Material Exemption 2014 http://www.epa.nsw.gov.au/resources/waste/rre14-public-road.pdf
- The Recovered Aggregate Exemption 2014 http://www.epa.nsw.gov.au/resources/waste/rre14-aggregate.pdf
- The Reclaimed Asphalt Pavement Exemption 2014 http://www.epa.nsw.gov.au/resources/waste/rre14-reclaimed-asphalt.pdf
- The Mulch Exemption 2016 https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/wastegrants/rre16-mulch.pdf

Note also that an EPL is not required for the land application of Virgin Excavated Natural Material (VENM), which the Act defines as:

"*natural material (such as clay, gravel, sand or rock fines):*

(a) that has been excavated or quarried form areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial, mining or agricultural activities and

(b) that does not contain any sulfidic ores or soils or any other waste.

If any VENM is transported to the site (*i.e.* without chemical testing and validation) the VENM certificate must be filled out and completed by the supplier (http://www.epa.nsw.gov.au/waste/virgin-material.htm). This record must be kept for six years and made available to EPA officers upon any request.

Sections 4.3.1 and 4.3.2 below consider regulatory requirements for the application to land of waste material; in addition to the receipt, storage and processing of waste material relevant to the proposal. It is anticipated that no activities which are component to proposal would constitute a scheduled activity requiring licencing under the POEO Act. The proposal shall however, be referred to NSW Environment Protection Agency (EPA) to confirm whether or not a licence is required.

4.3.1 Waste regulatory considerations for the development of the Stage 2 stockpile site area

Waste disposal involving application of waste to land is a scheduled activity under clause 39, schedule 1 of the POEO Act.

Any material which is imported to the site to be applied to the land for the purpose of developing the stockpile depot shall comply with relevant resource recovery exemptions – primarily the Excavated Natural Material Exemption 2014.

Construction and stabilisation of internal access roads may also utilise material in accordance with the Reclaimed Asphalt Pavement Exemption 2014 and the Recovered Aggregate Exemption 2014.

4.3.2 Waste regulatory considerations for the operation of Beach Rd Stockpile Depot

Under section 90B of the Waste Regulation, a facility (other than a scheduled waste disposal facility) in the metropolitan levy area (which includes the Shoalhaven), is considered to be a *construction and demolition waste facility* if it receives 6,000 tonnes or more of construction waste in any 12-month period. Construction waste for this purpose means material that results from the construction of buildings or infrastructure (such as roads, tunnels, airports and infrastructure for sewage, water, electricity and telecommunications) and includes materials such as bricks, concrete, paper, plastics, glass, metal, timber (including treated timber), soil and other excavated material (other than virgin excavated natural material).

Table 5 shows the estimated maximum waste quantities that would be received at Beach Rd Stockpile Depot from relevant sources, with a maximum total of 5000 tonnes of waste received per year, demonstrating that the facility would not require licencing as a scheduled construction and demolition waste facility.

Table 6 provides an assessment of anticipated waste storage and processing activities against relevant POEO Act Scheduled Activity thresholds, demonstrating that proposed activities would not constitute scheduled activities under the POEO Act. Management of on-site material would ensure that total storage of waste which does not meet the conditions of a resource recovery order would not exceed 1000 tonnes or 1000 cubic metres at any time.

Table 5. Estimated maximum annual waste quantities received at Beach Rd Stockpile Depot

Source	Max. quantity
Heavy patching: 40tonne/wk x 50wk (Note: proposed new machinery would enable immediate reuse of material, negating the need to process and store this material)	2000tonne/yr
Shoulders & drains: 50tonne/wk x 50wk (Note: this material would be mostly ENM, with an estimated maximum of 500tonne/yr of material requiring treatment)	2500tonne/yr
Backhoe drainage: 10tonne/wk x 50wk (Note: almost exclusively ENM. Includes rock material)	500tonne/yr
TOTAL	**5000tonne/yr**

Table 6. Assessment against relevant POEO Act Scheduled Activity thresholds

Specific activity clauses	Relevant scheduled activity threshold	Additional considerations	Assessment
15 Contaminated soil treatment (1) This clause applies to ***contaminated soil treatment***, meaning the on site or off site treatment of contaminated soil (including, in either case, incineration or storage of contaminated soil but excluding excavation for treatment at another site).	capacity to treat more than 1,000 cubic metres per year of contaminated soil received from off site		Treatment of contaminated soil would involve aerobic bioremediation of hydrocarbon-contamination where exceeding ENM classification threshold and other criteria for ENM is met. Capacity for soil treatment is not anticipated to be more than 500 cubic metres of soil per year. Would **not** be a scheduled activity.
16 Crushing, grinding or separating (1) This clause applies to ***crushing, grinding or separating***, meaning the processing of materials (including sand, gravel, rock or minerals, but not including waste of any description) by crushing, grinding or separating them into different sizes.	capacity to process more than 150 tonnes of materials per day or 30,000 tonnes of materials per year.		Separation of rock from soil may occur very rarely e.g. isolation of rock / cobble material from creek sand and sediment for different reuse purposes. Capacity is not anticipated to be more than 50 tonnes per year. Would **not** be a scheduled activity.
41 Waste processing (non-thermal treatment) (1) This clause applies to the following activities— ***non-thermal treatment of general waste***, meaning the receiving of waste (other than hazardous waste, restricted solid waste, liquid waste or special waste) from off site and its processing otherwise than by thermal treatment.	having on site at any time more than 1,000 tonnes or 1,000 cubic metres of waste, or processing more than 6,000 tonnes of waste per year	This clause does not apply to the processing of any of the following— (a) stormwater, (b) contaminated soil, (c) contaminated groundwater, (d) sewage within a sewage treatment system (whether or not that system is licensed).	Non-thermal treatment of waste would be limited to contaminated soil treatment which is considered under clause 15 and to which clause 41 does not apply. Would **not** be a scheduled activity.

42 Waste storage (1) This clause applies to ***waste storage***, meaning the receiving from off site and storing (including storage for transfer) of waste. (1A) Waste is taken to be stored at premises for the purposes of this clause even if the waste is only being transferred at those premises between units of rolling stock, motor vehicles or trailers.	more than 1,000 tonnes or 1,000 cubic metres of waste stored on the premises at any time, or more than 6,000 tonnes of waste received per year from off site	This clause does not apply to the receiving of waste from off site and its storage if— (a) the waste is to be sold or supplied from those premises as landscaping material (that is, as lawful soil amendments or for landscape gardening) and nothing else occurs in respect of the waste at the premises other than storage of the waste for the purpose of that sale or supply, and (b) the waste is virgin excavated natural material or meets all of the conditions of a resource recovery order (made under clause 93 of the POEO Act) at the time it is received	Total waste received per year would not exceed 5000 tonnes (refer to Table 5). It is anticipated that most waste received would meet all of the conditions of a resource recovery order and would be supplied for reuse as landscaping material. There is no applicable limit to storage of this material. Material which does not meet the conditions of a resource recovery order at the time that it is received, and which would require treatment or disposal, is not anticipated to exceed 500 cubic metres of material per year. Management of on-site material would ensure that total storage of waste that does not meet the conditions of a resource recovery order would not exceed 1000 tonnes or 1000 cubic metres at any time. Would **not** be a scheduled activity.

4.4 Other

A summary of other relevant legislation and permissibility is provided in Table 6 below.

Table 6. Summary of other relevant legislation and permissibility

NSW STATE LEGISLATION
Environmental Planning and Assessment Act 1979 **(EP&A Act)**
Permissible √ Not permissible ☐
The Transport and Infrastructure SEPP provides for the proposed works to be undertaken without development consent (refer above). In circumstances where development consent is not required, the environmental assessment provisions outlined in Part 5 of the Act are required to be complied with. This REF fulfils this requirement.
Shoalhaven Local Environmental Plan 2014 (SLEP)
Permissible √ Not permissible ☐
Under the SLEP the proposed activity may have required development consent. The provisions of Transport and Infrastructure SEPP, however, prevail over the SLEP where there is an inconsistency by virtue of Section 3.28 of the EP&A Act. Consequently, development consent is not required.
Fisheries Management Act 1994
Permissible √ Not permissible ☐
Justification: The proposed activity: • would not affect declared aquatic reserves (Part 7, Division 2 of the Act); • would not involve dredging or reclamation in Key Fish Habitat (Part 7, Division 3); • would not involve or result in the blocking the passage of fish (s.219); • would not impact mangroves and marine vegetation (Part 7, Division 4); • would not involve disturbance to gravel beds where salmon or trout spawn (s.208); • does not involve the release of live fish (Part 7, Division 7); • does not involve the construction of dams and weirs (s.218); • would not impact threatened species or endangered ecological communities (Part 7A); • does not constitute a declared key threatening process (Part 7A); and • would not use explosives in a watercourse (Clauses 70 and 71 of the *Fisheries Management (General) Regulation 2019).* A Fisheries Permit is therefore not required.
National Parks and Wildlife Act 1974 **(NP&W Act)**
Permissible √ Not permissible ☐
The proposed activity would not encroach into National Park estate. The Act provides the basis for the legal protection and management of Aboriginal sites in NSW. Under Sections 86 and 90 of the Act it is an offence to disturb an Aboriginal object or knowlingly

destroy or damage, or cause the destruction or damage to, an Aboriginal object or place, except in accordance with a permit of consent under section 87 and 90 of the Act.
As there are no recorded sites or visible objects and as the site is on 'disturbed land', the Due Diligence Guidelines requires no further assessment as it is reasonable to conclude that there is a low probability of objects occurring in the area of the proposed activity and an AHIP is not required. Refer to Section 3.4 for more information.

Heritage Act 1977

Permissible √ Not permissible ☐

The proposed activity would not disturb an item of state heritage significance. The proposal would occur in a previously disturbed area. Works can be undertaken with caution under an applicable exception from an excavation permit under s139(1) and (2) of the *Heritage Act 1977*.

Refer to s3.5 of this REF for more information.

Water Management Act 2000

Permissible √ Not permissible ☐

- Local councils are exempt from s.91E(1) of the Act in relation to all controlled activites that they carry out in, on or under waterfront land by virtue of clause 41 of the *Water Management (General) Regulation 2018.*
- The proposal would not interfere with the aquifer and therefore an interference licence is not required (s.91F).

State Environmental Planning Policy (Resilience and Hazards) 2021

Permissible √ Not permissible ☐

The proposed activity would be undertaken on land not mapped for the purpose of the SEPP.

Other considerations of the SEPP are not applicable to the proposed activity.

COMMONWEALTH LEGISLATION

Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EP&BC Act)

Permissible √ Not permissible ☐

The proposed activity would not be undertaken on Commonwealth land and no matters of National Environmental Significance are likely to be significantly impacted by the proposed activity (Section 3.3). The proposed activity is therefore not a controlled action and does not require Commonwealth referral.

Commonwealth *Native Title Act 1993*

Permissible √ Not permissible ☐

The proposal would occur entirely within freehold land (Lot B DP 185785) classified as operational land on 29/03/1994.

It is therefore assumed that Native Title has been extinguished as a Previous Exclusive Possession Act. No procedural rights are applicable.

5. CONSULTATION WITH GOVERNMENT AGENCIES

5.1 Transport & Infrastructure SEPP

Note that consultation under Chapter 2, Part 2.2 of the Transport & Infrastructure SEPP applies only to relevant development undertaken as development without consent under the provisions of Chapter 2.

Section 2.10 – Development with impacts on council-related infrastructure or services

No impacts on stormwater management systems, sewerage systems, water infrastructure, public places, nor excavation of footpaths, such as described under section 2.10(1) would occur.

The proposal would result in a minor increase in traffic and truck access and egress between the site and Beach Rd. The asset custodian for the road is also the proponent of the proposal.

Consultation under section 2.10 is therefore not required.

Section 2.11 – Development with impacts on local heritage

No listed heritage items occur in proximity to the proposal. Refer to Section 3.5 of this REF for more information.

Consultation under section 2.11 is therefore not required.

Section 2.12 – Development with impacts on flood liable land

The proposal would occur on land which is not mapped as being flood liable.

Consultation under section 2.12 is therefore not required.

Section 2.13 – Consultation with State Emergency Service—development with impacts on flood liable land

The proposal would occur on land which is not mapped as being flood liable.

Consultation under section 2.13 is therefore not required.

Section 2.14 – Development with impacts on certain land within the coastal zone

The proposal would not occur within a coastal vulnerability area. Consultation is therefore not required.

Section 2.15 – Consultation with public authorities other than councils

In consideration of the consultation requirements specified under section 2.15 of the Transport and Infrastructure SEPP, the proposed activity:

- would not be undertaken on adjacent to land reserved under the *National Parks and Wildlife Act 1974* or in Zone E1 or in equivalent zones.

- does not comprise a fixed or floating structure in or over navigable waters
- would not increase the amount of artificial light in the night sky and located on land within the dark sky region as identified on the dark sky region map
- would not be undertaken within Defence communications facility buffer (only relevant to the defence communications facility near Morundah)
- would not be undertaken on land in a mine subsidence district within the meaning of the *Mine Subsidence Compensation Act 1961*
- would not be development on, or reasonably likely to have an impact on, a part of the Willandra Lakes Region World Heritage Property—the World Heritage Advisory Committee and Heritage NSW,
- does not comprise development within a Western City operational area specified in the Western Parkland City Authority Act 2018, Schedule 2 with a capital investment value of $30 million or more—the Western Parkland City Authority constituted under that Act.

The consultation requirements specified under section 2.15 of the Transport and Infrastructure SEPP therefore do not apply.

Section 2.16 – Consideration of Planning for Bush Fire Protection (PBP)

The proposed activity is not a type applicable to this clause *i.e.* health services facilities, correctional centres and residential accommodation. Consideration of PBP is therefore not required, however, bush fire risk and any requirements for asset protection zones shall be considered in the location of sheds and other storage structures (refer to section 3.9 of this REF).

Summary

No consultation is required under Chapter 2, Part 2.2 of the Transport & Infrastructure SEPP.

6. COMMUNITY ENGAGEMENT

Notification of the proposal and opportunity for comment shall be provided to relevant Community Consultative Bodies and surrounding property owners and residents (within 1 km of the site - minimum).

7. ENVIRONMENTAL SAFEGUARDS AND MEASURES TO MINIMISE IMPACTS

Note that all safeguards are prescribed unless otherwise stated.

Safeguard / Measure	Responsibility
Works planning, approvals, consultation & notification	
1. A site layout plan and stormwater design shall be developed which includes the following: a) All components of the layout plan and stormwater design within the Stage 1 and Stage 2 site footprints, as shown in Figure 1 of this REF, including provision of a 3.0 m buffer to vegetation around the Stage 2 footprint perimeter. b) Level, stabilised, terraced areas for functionality of the stockpile depot and to reduce the area of effective slopes which are subject to potential erosion. c) Constructed and retained slopes within the footprint shall be stabilised with hard or soft landscaping as appropriate, depending on the gradient. d) Internal drainage including diversion banks above stockpile areas; drainage between stockpile areas containing filtration and energy dissipation; and a permanent sediment basin (as per SWMP – refer to safeguard 2 below).	SCC District Engineer / SCC Project Engineer
2. A Soil and Water Management Plan (SWMP) shall be prepared which includes: a) Staging of works (refer to safeguard 3 below). b) Erosion and sediment controls across the slope and above and within drainage lines as appropriate, in accordance with the 'Blue Book' (Landcom 2004), to minimise erosion of soil and sediment movement into watercourses following vegetation clearing and earth-moving activities. c) Design and construction of a permanent sediment basin in initial staging of works for ongoing service of the stockpile depot.	SCC District Engineer / SCC Project Engineer
3. Clearing and development of the Stage 2 footprint shall be staged to minimise the area of disturbed and unstabilised land which is prone to erosion, at any one time. Staging shall involve clearing and stabilising of the lower, western edge of the footprint through to the north-west corner of the	SCC District Engineer / SCC Project Engineer

Safeguard / Measure	Responsibility
site, and the establishment of the permanent sediment basin, prior to the development of other areas of the site. Staging shall involve the complete development of terraced levels (or otherwise separate areas) to every practical extent.	
4. Clearing and development of the site shall be carried out in drier months (mid-Autumn through to mid-Spring) to every practical extent, to reduce the risk of erosion and sediment movement.	SCC Maintenance Supervisor
5. The proposal shall be referred to NSW Environment Protection Agency (EPA) to confirm whether or not a licence is required for the proposed operation of the stockpile depot. An Environmental Protection Licence (EPL) shall be obtained if required and all conditions of the EPL shall be adhered to.	SCC Environmental Officer
6. Notification of the proposal and opportunity for comment shall be provided to relevant Community Consultative Bodies and surrounding property owners and residents (within 1 km of the site - minimum)	SCC District Engineer / SCC Project Engineer
7. This REF must be published on the determining authority's (Council's) website or the NSW planning portal, in accordance with clause 171(4) EP&A Regulation 2021 and the guidelines published under cl.170, as being a matter of public interest.	SCC Environmental Officer
Site Establishment	
8. It is recommended that signage advising of "trucks turning" be installed on approach to the site entrance from both directions along Beach Rd.	SCC District Engineer / SCC Maintenance Supervisor
9. Any machinery, vehicles and stockpiles utilised during construction shall be stored and / or operated within the project footprint and existing cleared areas only. Works, machinery and vehicles shall not encroach into the canopies of trees that are to be retained and protected. A buffer of minimum 3 m to tree trunks and 5 m to watercourses shall be maintained.	SCC Maintenance Supervisor
10. Machine operators shall keep an emergency spill kit on-site at all times with procedures to contain and collect any leakage or spillage of fuels, oils and greases from plant and equipment.	SCC Maintenance Supervisor
11. No major equipment maintenance works shall be undertaken on-site.	SCC Maintenance Supervisor
12. Any on-site refuelling of machinery shall be carried out with due care to avoid spilling fuel and a tray shall be used to catch any accidentally spilt fuel.	SCC Maintenance Supervisor

Safeguard / Measure	Responsibility
Construction works	
13. Erosion and sediment controls shall be installed in accordance with the site specific SWMP (refer to safeguard 2). Any temporary sediment and erosion controls shall be maintained in good working order for the duration of the works and subsequently until associated areas of the site are suitably stabilised and the risk of sediment movement is minimal.	SCC Maintenance Supervisor
14. A stabilised entry of ballast rock shall be constructed near the main gated entryway to the site to reduce soil being tracked onto Beach Rd.	SCC Maintenance Supervisor
15. The boundary of the Stage 2 footprint shall be slashed and delineated in accordance with the site plan and under supervision of SCC Environmental Officer prior to further clearing works, to minimise the risk of encroachment into vegetation to be retained.	SCC Maintenance Supervisor; SCC Environmental Officer
16. Clearing and development of the site shall be staged and in accordance with the SWMP.	SCC Maintenance Supervisor
17. Vegetation removal shall be monitored by Council's Environmental Officer, with inspection of burrows and other habitat, and exclusion or relocation of resident fauna as appropriate.	SCC Environmental Officer
18. Tree protection measures in accordance with AS4970 – *Protection of trees on development sites* shall be implemented to minimise the risk of impact to the structural root zones of trees to be retained.	SCC Maintenance Supervisor
19. Stockpile / storage areas and access roads shall be stabilised by compaction and with suitable material to reduce the risk of erosion, sediment and dust movement.	SCC Maintenance Supervisor
20. Batters, embankments and any disturbed table drains shall be stabilised with hard or soft landscaping as per design plan. Where jute mesh and seeding or hydromulch is to be used, seed shall be low native groundcovers as per safeguard 21 below.	SCC Maintenance Supervisor
21. A 3.0 m buffer to surrounding vegetation shall be established around the perimeter of the Stage 2 footprint, with sediment controls (silt fence and coir logs as appropriate) and planting or seeding with low, native groundcovers including the following species: *Lomandra longifolia, Poa labillardieri, Carex longebrachiata, Carex appressa, Microlaena stipoides, Cynodon dactylon, Dianella caerulea* and *Hardenbergia violacea*.	SCC Maintenance Supervisor; SCC Environmental Officer

Safeguard / Measure	Responsibility
22. The vegetation buffer zone around the perimeter of the site shall be fenced or otherwise delineated and shall be identified with signage as “environmental area”.	SCC Maintenance Supervisor
23. In the event that any wildlife be significantly disturbed or injured during works, Council’s Environmental Officers are to be contacted on 4429 3405, or if unavailable, Wildlife Rescue – South Coast should be contacted on 0418 427 214, to rescue and relocate the animal(s).	SCC Maintenance Supervisor; SCC Environmental Officer
24. Staff working at the site will be instructed to stop work immediately on identification of any suspected Aboriginal heritage artefact. If any objects are found, NSW Department of Planning, Industry and Environment (ph:131 555) shall be contacted.	SCC Maintenance Supervisor
25. In the event that any relics are found during works, notification to NSW Heritage Council is required under s146 of the Heritage Act 1977.	SCC Maintenance Supervisor
26. No machinery shall operate within watercourses.	SCC Maintenance Supervisor
27. If engineering fill is imported to the site, all conditions prescribed in the applicable Resource Recovery Exemptions and associated Orders shall be complied with, including: • ensuring the producer of the waste has complied with the applicable Order such as testing and validation • ensuring the material has met all chemical and other material requirements specified in the applicable Order • keeping a written record of the following for a period of six years: o the quantity of material received o the name and address of the supplier	SCC Maintenance Supervisor
28. If Virgin Excavated Natural Material (VENM) is taken to the site (*i.e.* without chemical testing and validation): a. the material must meet the definition of VENM (http://www.epa.nsw.gov.au/waste/virgin-material.htm) b. the supplier must fill out and complete the *VENM Certificate* The completed *VENM Certificate* shall be kept for at least six years and provided to the EPA upon any request.	SCC Maintenance Supervisor
29. Any application of waste material to land shall be in accordance with relevant NSW Resource Recovery Exemptions (RRE’s) under the *Protection of Environment Operations (Waste) Regulation 2014*, including:	SCC Maintenance Supervisor

Safeguard / Measure	Responsibility
a) Material classified as Excavated Natural Material (ENM) or Recovered Aggregate may be used to level and stabilise stockpile areas. b) Material classified as Reclaimed Asphalt Pavement, Recovered Aggregate or ENM may be used in construction and stabilisation of internal access roads.	
30. Any waste generated on site shall be reused in accordance with relevant Resource Recovery Orders and Exemptions, or otherwise disposed of at a licenced waste facility.	SCC Maintenance Supervisor
Post construction and future works	
31. Additional shrubs shall be planted to infill gaps between trees and shrubs greater than 1.0 m, and enhance the vegetated screen along Beach Rd, while maintaining appropriate sight lines. Planting shall be to a density of 2 plants per square metre and shall utilise the following species: *Elaeocarpus reticulatus, Breynia oblongifolia, Clerodendrum tomentosum, Diospyros australis, Notelaea longifolia, Myrsine variabilis* and *Lomandra longifolia.*	SCC Maintenance Supervisor; SCC Environmental Officer
32. Construction or installation of storage sheds shall be undertaken on levelled and stabilised ground (refer above) and shall be situated to provide for suitable asset protection zones (APZs) within the existing Stage 2 footprint, without requiring any additional vegetation clearing.	SCC Maintenance Supervisor
33. It is recommended that water tanks be installed to capture rainwater from the roof of any storage shed, for use in wetting down stockpiled material which is prone to dust movement.	SCC Maintenance Supervisor
Operation of Beach Road Stockpile Depot	
34. An operational management plan shall be developed which provides for the ongoing operation and management of the Beach Rd Stockpile Depot. Any staff or contractor utilising the stockpile depot shall be required to do so in accordance with the management plan. The management plan shall apply the *Standards for managing construction waste in NSW* (EPA 2019) regardless of whether or not an EPL is required. The management plan shall cover, but not be limited to, the following: a) Authorised use of the stockpile depot: being the temporary storage of construction materials and components; and the temporary storage, sorting, testing and treatment of waste materials for reuse in accordance with relevant NSW EPA	SCC District Engineer; SCC Maintenance Supervisor; SCC Environmental Officer

Safeguard / Measure	Responsibility
Resource Recovery Exemptions (RRE's), or where appropriate, disposal at a off-site licenced facility. b) Allowable materials and quantities for stockpiling: i) Construction materials and components and waste material intended for temporary storage and appropriate reuse or off-site disposal only. ii) No material which is known to be special waste, liquid waste or hazardous waste shall be imported to the site (refer to NSW EPA Waste Classification Guidelines). iii) If operating as a non-scheduled facility and carrying out non-scheduled activities (i.e. without an EPL), the annual and ongoing storage quantities of waste shall not exceed relevant thresholds under Schedule 1 of the Waste Regulation including: more than 1,000 tonnes or 1,000 cubic metres of waste stored on the premises at any time; or more than 6,000 tonnes of waste received per year from off-site – which does not meet all of the conditions of a resource recovery order to be supplied for reuse as landscaping material (refer to section 4.3 of this REF for more information). c) Stockpile set-out configuration and management: i) Area set-out shall provide for efficient use of space, suitable access and egress and effective organisation of stored materials. ii) Any material stored at the site shall be placed within designated stockpile areas without encroaching into the buffer zone or other native vegetation areas. iii) Stockpile configuration and management shall be in accordance with the 'Blue Book'. iv) If stockpiles are to be in place for more than 10 days, they shall be stabilised, e.g. with sterile grass seed or covered with geofabric. v) Stockpiles and exposed ground shall be wet down where the risk of dust movement is high. vi) All materials received at the stockpile depot shall be: • Placed in suitable receiving area; • Recorded (including source location, material type, volume and stockpile location with identifier and labelling of stockpile using garden tags, timber stakes or similar);	

Safeguard / Measure	Responsibility
• Tested for waste classification in accordance with relevant EPA Resource Recovery Order(s); • Sorted in accordance with waste classification; • Treated as appropriate, if required; • Reused in accordance with relevant EPA Resource Recovery Exemption(s) or disposed of at a licence waste facility if reuse is not applicable. d) Safety protocols: i) Access and egress shall be limited to the main gate and restricted to prevent uncontrolled stockpiling or dumping of material on the site. ii) Roadside vegetation shall be managed to provide for clear line-of-site in both directions from the entrance. iii) Storage of hazardous products (e.g. fuels and pesticides) shall involve containment and isolation in sheds within sealed, bunded areas; and with hazard signage and provision of on-site spill kits. e) Site monitoring and maintenance including: i) Permanent drainage infrastructure including the sediment basin shall be maintained as required. ii) Environmental impacts shall be monitored and addressed as required, including encroachment into protected areas; sediment movement; and any environmental weeds imported to the site via received material. iii) Stockpile management shall be monitored and any non-compliant practices or activities shall be addressed.	
35. The management plan shall be reviewed on a yearly basis and revised as appropriate, with consideration of stockpile operations (including staff compliance with processes and protocols; and effective organisation and management of materials) and impacts on the environment (including erosion and sediment management; weed infestations; and encroachments into protected environmental areas).	SCC District Engineer; SCC Maintenance Supervisor; SCC Environmental Officer

8. SIGNIFICANCE EVALUATION & DECISION STATEMENT

This Review of Environmental Factors has assessed the likely environmental impacts, in the context of Part 5 of the Environmental Planning and Assessment Act 1979, of a proposal by Shoalhaven City Council for the establishment and operation of a stockpile depot site at Beach Rd, Berry.

In consideration of the proposal as described in Section 1, in accordance with any design plans referred to in this report, and assuming the implementation of all proposed safeguards and mitigation measures (Section 7), it is determined that:

1. It is unlikely that there will be any significant environmental impact as a result of the proposed activity and an Environmental Impact Statement is not required.
2. The proposed activity will not be carried out in a declared area of outstanding biodiversity value and is not likely to significantly affect threatened species, populations or ecological communities, or their habitats, and a Species Impact Statement / BDAR is not required.
3. No statutory approvals, licences, permits or external government consultations are required.
4. The proposed activity may proceed.

In accepting and adopting this REF, Shoalhaven City Council commits to ensuring the implementation of the proposed safeguards and mitigation measures identified in this report (Section 7) to minimise and/or prevent detrimental environmental impacts.

Determined by:

Michael Berzins

Manager of Works & Services (Acting)

Shoalhaven City Council Date: 16/07/2024

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APPENDIX A – Flora species recorded on site

Table A.1. Flora species recorded within and adjacent to the site

PCT3154 Illawarra Blackbutt Moist Forest	
Overstorey / canopy trees *Angophora floribunda* (Rough-barked Apple) *Eucalyptus eugenioides* (Blue Stringybark) *Eucalyptus paniculata* (Grey Ironbark) *Eucalyptus pilularis* (Blackbutt) *Eucalptus saligna x botryoides* (Southern Blue Gum) Understorey / low canopy trees *Acacia binervata* (Two-veined Hickory) *Acacia maidenii* (Maiden's Wattle) *Acacia mearnsii* (Black Wattle) *Acmena smithii* (Lilli Pilli) *Alphitonia excelsa* (Red Ash) *Glochidion ferdinandi* (Cheese Tree) Mid-storey species *Breynia oblongifolia* (Coffee Bush) *Clerodendrum tomentosum* (Hairy Clerodendrum) *Diospyros australis* (Black Plum) *Exocarpos cupressiformis* (Cherry Ballart) *Gahnia melanoxylon* (Black-fruited Saw-sedge) *Notelaea longifolia* (Mock Olive) *Toona ciliata* (Red Cedar) *Zieria smithii* (Sandfly Zieria) Groundcover species *Calochlaena dubia* (Rainbow Fern) *Carex longebrachiata* (Carex) *Dichondra repens* (Kidney Weed)	Groundcover species (cont.) *Diplodium spp.* (Hyacinth Orchid) *Entolasia marginata* (Wiry Panic Grass) *Eustrephus latifolius* (Wombat Berry) *Geitonoplesium cymosum* (Scrambling Lily) *Glycine spp* (Glycine) *Gynochthodes jasminoides* (Sweet Morinda) *Hibbertia scandens* (Guinea Flower) *Hydrocotyle spp.* (Pennywort) *Lastreopsis microsora* (Creeping Shield Fern) *Lomandra longifolia* (Spiny Mat-rush) *Marsdenia rostrata* (Milk Vine) *Microlaena stipoides* (Weeping Meadow Grass) *Oplismenus imbecillis* (Basket Grass) *Pandorea pandorana* (Wonga Vine) *Parsonsia straminea* (Common Silkpod) *Poa labillardieri* (Tussock Grass) *Tylophora barbata* (Bearded Tylophora) Exotic invasive species *Lantana camara* (Lantana) *Ligustrum sinense* (Small-leaf Privet) *Lonicera japonica* (Japanese Honeysuckle) *Nephrolepis cordifolia* (Fishbone Fern) *Onopordium acanthium* (Scotch Thistle) *Solanum mauritianum* (Wild Tobacco) *Strelitzia nicolai* (Bird of Paradise) *Thunbergia alata* (Black-eyed Susan)

PCT4009 Shoalhaven Lowland Flats Wet Swamp Forest	
Overstorey / canopy trees *Angophora floribunda* (Rough-barked Apple) *Eucalyptus robusta* (Swamp Mahogany) Understorey / low canopy trees *Glochidion ferdinandi* (Cheese Tree) Mid-storey species *Cyathea australis* (Rough Tree Fern) *Gahnia sieberiana* (Red-fruited Saw-sedge) *Leptospermum continentale* (Prickly Tea Tree) *Myrsine variabilis* (Muttonwood) Groundcover species *Adiantum aethiopicum* (Maidenhair Fern) *Carex appressa* (Carex) *Carex longebrachiata* (Carex) *Carex maculata* (Carex) *Christella detata* (Binung Fern) *Dichondra repens* (Kidney Weed) *Doodia aspera* (Rasp Fern) *Eustrephus latifolius* (Wombat Berry)	Groundcover species (cont.) *Geitonoplesium cymosum* (Scrambling Lily) *Gynochthodes jasminoides* (Sweet Morinda) *Hydrocotyle spp.* (Pennywort) *Hypolepis glandulifera* (Downy Ground Fern) *Imperata cylindrica* (Blady Grass) *Juncus usitatus* (Common Rush) *Lastreopsis microsora* (Creeping Shield Fern) *Marsdenia rostrata* (Milk Vine) *Pandorea pandorana* (Wonga Vine) *Parsonsia straminea* (Common Silkpod) *Poa labillardieri* (Tussock Grass) *Ranunculus inundates* (River Buttercup) *Sarcopetalum apetalum* (Snake Vine) *Viola hederacea* (Native Violet) Exotic invasive species *Ageratina adenophora* (Crofton Weed) *Araujia sericifera* (Moth Vine) *Lantana camara* (Lantana) *Setaria sphacelata* (South African Pigeon Grass)

PCT3153 Illawarra Escarpment Bangalay x Blue Gum Wet Forest	
Overstorey / canopy trees *Angophora floribunda* (Rough-barked Apple) *Eucalyptus pilularis* (Blackbutt) *Eucalyptus robusta* (Swamp Mahogany) *Eucalptus saligna x botryoides* (Southern Blue Gum) Understorey / low canopy trees *Acacia binervata* (Two-veined Hickory) *Acacia mearnsii* (Black Wattle) *Acmena smithii* (Lilli Pilli) *Glochidion ferdinandi* (Cheese Tree) *Melaleuca linarifolia* (Flax-leaved Paperbark) *Pittosporum undulatum* (Sweet Pittosporum) *Toona ciliata* (Red Cedar) Mid-storey species *Breynia oblongifolia* (Coffee Bush) *Cyathea australis* (Rough Tree Fern) *Cyathea cooperi* (Straw Tree Fern) *Duboisia myoporoides* (Corkwood) *Gahnia melanoxylon* (Black-fruited Saw-sedge) *Gahnia sieberiana* (Red-fruited Saw-sedge) *Livistona australis* (Cabbage Palm) *Myrsine variabilis* (Muttonwood) *Notelaea longifolia* (Mock Olive) *Ozothamnus diosmifolius* (Rice Flower) *Tristaniopsis laurina* (Watergum) *Zieria smithii* (Sandfly Zieria) Groundcover species *Adiantum aethiopicum* (Maidenhair Fern) *Calochlaena dubia* (Rainbow Fern) *Carex longebrachiata* (Carex) *Carex maculata* (Carex) *Christella detata* (Binung Fern) *Clematis aristata* (Old Man's Beard)	Groundcover species (cont.) *Dianella caerulea* (Blue Flax Lily) *Dichondra repens* (Kidney Weed) *Doodia aspera* (Rasp Fern) *Echinopogon caespitosus* (Hedgehog Grass) *Entolasia marginata* (Wiry Panic Grass) *Entolasia stricta* (Wiry Panic Grass) *Eustrephus latifolius* (Wombat Berry) Geitonoplesium cymosum (Scrambling Lily) *Gynochthodes jasminoides* (Sweet Morinda) *Imperata cylindrica* (Blady Grass) *Juncus usitatus* (Common Rush) *Lastreopsis microsora* (Creeping Shield Fern) *Lobelia purpurascens* (Whiteroot) *Lomandra longifolia* (Spiny Mat-rush) *Marsdenia rostrata* (Milk Vine) *Microlaena stipoides* (Weeping Meadow Grass) *Oplismenus imbecillis* (Basket Grass) *Pandorea pandorana* (Wonga Vine) *Pelaea falcata* (Sickle Fern) *Poa labillardieri* (Tussock Grass) *Pteridium esculentum* (Bracken Fern) *Senecio linearifolius (Forest Groundsel)* *Stephania japonica* (Snake Vine) *Viola hederacea* (Native Violet) Exotic invasive species *Ageratina adenophora* (Crofton Weed) *Ageratina riparia* (Mistflower) *Lantana camara* (Lantana) *Ligustrum sinense* (Small-leaf Privet) *Lonicera japonica* (Japanese Honeysuckle) *Solanum mauritianum* (Wild Tobacco) *Solanum pseudocapsicum* (Magenta Winter Cherry)

APPENDIX B – Threatened Species Likelihood of Occurrence

NSW Threatened Species Likelihood of Occurrence Table

The table of likelihood of occurrence evaluates the likelihood of threatened species to occur on the subject site. This list is derived from previously recorded species within a 5 km radius (taken from NSW BioNet Atlas) around the subject site. Ecology information unless otherwise stated, has been obtained from the *Threatened Biodiversity Profile Search* on the NSW OEH (Office of Environment & Heritage) online database (https://www.environment.nsw.gov.au/threatenedspeciesapp/).

Likelihood of occurrence in study area

1. Unlikely – Species, population or ecological community is not likely to occur. Lack of previous recent (<25 years) records and suitable potential habitat limited or not available in the study area.
2. Likely – Species, population or ecological community could occur and study area is likely to provide suitable habitat. Previous records in the locality and/or suitable potential habitat in the study area.
3. Present – Species, population or ecological community was recorded during the field investigations.

Possibility of impact

1. Unlikely – The proposal would be unlikely to impact this species or its habitats. No NSW *Biodiversity Conservation Act 2016* "Test of Significance" or EPBC Act significance assessment is necessary for this species.
2. Likely – The proposal could impact this species, population or ecological community or its habitats. A NSW *Biodiversity Conservation Act 2016* "Test of Significance" and/or EPBC Act significance assessment is required for this species, population or ecological community.

Note that where further assessment is deemed required, this is undertaken within the REF as a Test of Significance (in the case of NSW listed species) or an EPBC Significant Impact Assessment (in the case of Commonwealth listed species).

Endangered Ecological Community name	***Status***	***Likelihood of presence within areas impacted by the activity***
Bangalay Sand Forest of the Sydney Basin and South East Corner Bioregions (BC Act)	Endangered - NSW BC Act	Site investigations confirmed that the EEC does not occur within or in close proximity to the site, such that there is any risk of impact on the EEC as a result of the proposal.
Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions (BC Act) *Subtropical and Temperate Coastal Saltmarsh* (EPBC Act)	Endangered - NSW BC Act Vulnerable - Commonwealth EPBC Act	Occurs near the site (within 200m) but site surveys confirmed that this EEC does not occur in close proximity such that it is at risk of being impacted by the proposal.
Freshwater wetlands on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions (BC Act)	Endangered - NSW BC Act	Site investigations confirmed that the EEC does not occur within or in close proximity to the site, such that there is any risk of impact on the EEC as a result of the proposal.
Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion (BC Act) *Illawarra and south coast lowland forest and woodland ecological community* (EPBC Act)	Endangered - NSW BC Act Critically Endangered - Commonwealth EPBC Act	Site investigations confirmed that the EEC does not occur within or in close proximity to the site, such that there is any risk of impact on the EEC as a result of the proposal.
Illawarra Subtropical Rainforest in the Sydney Basin Bioregion (BC Act) *Illawarra– Shoalhaven subtropical rainforest of the Sydney Basin Bioregion* (EPBC Act)	Endangered - NSW BC Act Critically Endangered - Commonwealth EPBC Act	Site investigations confirmed that the EEC does not occur within or in close proximity to the site, such that there is any risk of impact on the EEC as a result of the proposal.
Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (BC Act) *Littoral Rainforest and Coastal Vine Thickets of Eastern Australia* (EPBC Act)	Endangered - NSW BC Act Critically Endangered - Commonwealth EPBC Act	Site investigations confirmed that the EEC does not occur within or in close proximity to the site, such that there is any risk of impact on the EEC as a result of the proposal.
Lowland Grassy Woodland in the South East Corner Bioregion (BC Act) *Lowland Grassy Woodland in the South East Corner Bioregion* (EPBC Act)		Site investigations confirmed that the EEC does not occur within or in close proximity to the site, such that there is any risk of impact on the EEC as a result of the proposal.

Milton Ulladulla Subtropical Rainforest in the Sydney Basin Bioregion (BC Act) *Illawarra– Shoalhaven subtropical rainforest of the Sydney Basin Bioregion* (EPBC Act)	Endangered - NSW BC Act Critically Endangered - Commonwealth EPBC Act	Site investigations confirmed that the EEC does not occur within or in close proximity to the site, such that there is any risk of impact on the EEC as a result of the proposal.
River-flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (BC Act) *River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria* (EPBC Act)	Endangered - NSW BC Act Critically Endangered - Commonwealth EPBC Act	Site investigations confirmed that the EEC does not occur within or in close proximity to the site, such that there is any risk of impact on the EEC as a result of the proposal.
Robertson Basalt Tall Open-forest in the Sydney Basin and South Eastern Highlands Bioregions (BC Act)	Critically Endangered – NSW BC Act	Site investigations confirmed that the EEC does not occur within or in close proximity to the site, such that there is any risk of impact on the EEC as a result of the proposal.
Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions (BC Act) *Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community* (EPBC Act)	Endangered - NSW BC Act Endangered - Commonwealth EPBC Act	Indicative species and habitat of the EEC occur within and in proximity to the site, however, the vegetation community occurring was found to align more closely with Swamp Sclerophyll Forest EEC. Refer to s 3.2.2 of this REF for more information.
Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions (BC Act) *Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland* (EPBC Act)	Endangered - NSW BC Act Endangered - Commonwealth EPBC Act	Indicative species and habitat present. Vegetation community present is associated with the EEC. Further assessment was undertaken in s3.2.2 of this REF.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Daphnandra johnsonii	Illawarra Socketwood	Flora	Endangered NSW BC Act Endangered EPBC Act	Restricted to the Illawarra region where it has been recorded from the local government areas of Shoalhaven, Kiama, Shellharbour and Wollongong. Occupies the rocky hillsides and gullies of the Illawarra lowlands, occasionally extending onto the upper escarpment slopes. Associated vegetation includes rainforest and moist eucalypt forest. Associated soils include loams and clay loams derived from volcanic and fertile sedimentary rocks.	Unlikely to occur. Habitat is disturbed and unsuitable. Species is conspicuous and was not recorded during comprehensive flora surveys.
Rhodamnia rubescens	Scrub Turpentine	Flora	Critically Endangered NSW BC Act	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.	Unlikely to occur. Habitat is disturbed and unsuitable. Species is conspicuous and was not recorded during comprehensive flora surveys.
Litoria aurea	Green and Golden Bell Frog	Amphibian	Vulnerable EPBC Act Endangered NSW BC Act	Marshes, dams and stream-sides, particularly those containing bullrushes (Typha spp.) or spikerushes (Eleocharis spp.). Optimum habitat for the species includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (Gambusia holbrooki), with a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas (OEH 2017).	Unlikely to occur. No suitable habitat occurs on-site. Fragmented connectivity to known populations.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Botaurus poiciloptilus	Australasian Bittern	Bird	NSW BC Act Endangered EPBC Act Endangered	Occurs in terrestrial freshwater wetlands and, rarely, estuarine habitats. It favours wetlands with tall, dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water. The species favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and/or reeds (e.g. Phragmites, Cyperus, Eleocharis, Juncus, Typha, Baumea, Bolboschoenus) or cutting grass (Gahnia) growing over muddy or peaty substrate. Knowledge of the breeding ecology of the Australasian Bittern is relatively poor. Available data indicate that the Australasian Bittern breeds in relatively deep, densely vegetated freshwater swamps and pools, building its nests in deep cover over shallow water. In rushland, it may avoid breeding in the densest areas; alternatively, this may simply reflect the accessibility of the few nests that have been found. If population density is high, it may resort to open wetlands for nesting, e.g. in stunted Acacia, but this may be exceptional behaviour. It is clear that a complexity of habitat is required in order for foraging and breeding to occur in one location. The species requires shallow water, less than 30 cm deep with medium to low density reeds, grasses or shrubs for foraging and needs deeper water, with medium to high density reeds, rushes or sedges for nesting.	Unlikely to occur. No suitable habitat occurs on-site.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Limosa lapponica	Bar-tailed Godwit	Bird	Migratory EPBC Act	The Bar-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh. It has been sighted in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats. It is rarely found on inland wetlands or in areas of short grass, such as farmland, paddocks and airstrips, although it is commonly recorded in paddocks at some locations overseas.	Unlikely to occur. No suitable habitat occurs on-site.
Ixobrychus flavicollis	Black Bittern	Bird	Vulnerable NSW BC Act	Terrestrial and estuarine wetlands generally in areas of permanent water and dense vegetation that may comprise grassland, woodland forest rainforest and mangroves. Roosts in trees or on ground amongst dense reeds, nests in branches overhanging water	Unlikely to occur. No suitable habitat occurs on-site.
Ephippiorhynchus asiaticus	Black-necked Stork	Bird	Endangered NSW BC Act	Floodplain wetlands (swamps, billabongs, watercourses and dams) of the major coastal rivers are the key habitat in NSW for the Black-necked Stork. Secondary habitat includes minor floodplains, coastal sandplain wetlands and estuaries. Storks usually forage in water 5-30cm deep for vertebrate and invertebrate prey. Eels regularly contribute the greatest biomass to their diet, but they feed on a wide variety of animals, including other fish, frogs and invertebrates (such as beetles, grasshoppers, crickets and crayfish). Black-necked Storks build large nests high in tall trees close to water.	Unlikely to occur. No suitable habitat occurs on-site.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Limosa limosa	Black-tailed Godwit	Bird	Vulnerable NSW BC Act	Primarily a coastal species. Usually found in sheltered bays, estuaries and lagoons with large intertidal mudflats and/or sandflats. Further inland, it can also be found on mudflats and in water less than 10 cm deep, around muddy lakes and swamps. Individuals have been recorded in wet fields and sewerage treatment works. Forages for insects, crustaceans, molluscs, worms, larvae, spiders, fish eggs, frog eggs and tadpoles in soft mud or shallow water. Roosts and loafs on low banks of mud, sand and shell bars.	Unlikely to occur. No suitable habitat occurs on-site.
Hydroprogne caspia	Caspian Tern	Bird	Migratory EPBC Act	Occur along the Australian coastline, and also occur inland along major rivers, especially in the Murray-Darling and Lake Eyre drainage basins, preferring wetlands with clear water to allow easy prey detection.	Unlikely to occur. No suitable habitat occurs on-site.
Thalasseus bergii	Crested Tern	Bird	Migratory EPBC Act	Crested Terns inhabit coastal areas, offshore waters, beaches, bays, inlets, tidal rivers, salt swamps, lakes and larger rivers. The species breeds during Sep-Jan in the south and Mar-Jun in the north in large, dense colonies on small islands. Nesting occurs on sand or shingle among low vegetation behind the beaches (Pizzey & Knight 2012; Morcombe 2011)	Unlikely to occur. No suitable habitat occurs on-site.
Calidris ferruginea	Curlew Sandpiper	Bird	EPBC Act: Migratory NSW BC Act: Endangered	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Forages on mudflats and nearby shallow water.	Unlikely to occur. No suitable habitat occurs on-site.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Artamus cyanopterus cyanopterus	Dusky Woodswallow	Bird	Vulnerable NSW BC Act	The Dusky Woodswallow is often reported in woodlands is eastern, southern and southwestern Australia. In New South Wales it is widespread from coast to inland, including the western slopes of the great Diving Range and farther west. It is often reported in woodlands and dry open sclerophyll forests, usually dominated by eucalyptus, including mallee associations. It has also been recorded in shrublands and heathlands and various modified habitats including regenerating forests; very occasionally in moist forests of rainforests. At sites where Dusky Woodswallows are recorded the understorey is typically open with sparse eucalypt saplings, acacias and other shrubs, including heath. The ground cover may consist of grasses, sedges or open ground, often with course woody debris. Birds are often observed in farmland usually at the edges of forests, woodlands or in roadside remnants or wind breaks with dead timber. Nesting occurs from late September to late February, with eggs present between October and early December. They nest in an open shallow untidy cup, frequently in an open hollow, crevice or stump.	Possibly occurring. Suitable foraging habitat is present. Further assessment has been undertaken in s3.2.2
Dasyornis brachypterus	Eastern Bristlebird	Bird	Endangered EPBC Act Endangered NSW BC Act	Sedgeland/heathland/dry sclerophyll and woodlands- / requires thick shrub/heath layer for shelter, nesting and foraging	Unlikely to occur. No suitable habitat occurs on-site.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Numenius madagascariensis	Eastern Curlew	Bird	Critically Endangered EPBC Act	Most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes use the mangroves. The birds are also found in saltworks and sewage farms (Marchant & Higgins 1993).	Unlikely to occur. No suitable habitat occurs on-site.
Pezoporus wallicus wallicus	Eastern Ground Parrot	Bird	Vulnerable NSW BC Act	The Eastern Ground Parrot occurs in near coastal low heathlands and sedgelands, generally below one metre in height and very dense (up to 90% projected foliage cover). These habitats provide a high abundance and diversity of food, adequate cover and suitable roosting and nesting opportunities for the Ground Parrot, which spends most of its time on or near the ground. When flushed, birds fly strongly and rapidly for up to several hundred metres, at a metre or less above the ground (OEH 2013)	Unlikely to occur. No suitable habitat occurs on-site.
Pandion cristatus	Eastern Osprey	Bird	NSW BC Act Vulnerable	Favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Feed on fish over clear, open water. Breed from July to September in NSW. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea.	Possibly occurring transiently over or in proximity to the site. No suitable habitat occurs within the site.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Petroica phoenicea	Flame Robin	Bird	Vulnerable NSW BC ACT	Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. The ground layer of the breeding habitat is dominated by native grasses and the shrub layer may be wither sparse or dense. Occasionally occurs in temperate rainforest, and also in herbfields, heathlands, shrublands and sedgelands at high altitudes. In winter, birds migrate to drier more open habitats in the lowlands (i.e. valley below the ranges, and to the western slopes and plains. Often occurs in recently burnt areas; however, habitat becomes unsuitable as vegetation closes up following revegetation. In winter lives in dry forests, open woodlands and in pastures and native grasslands, with or without scattered trees. In winter, occasionally seen in heathland or other scrublands in coastal areas.	Unlikely to occur. No suitable habitat occurs on-site.
Apus pacificus	Fork-tailed Swift	Bird	Migratory EPBC Act	Occurring over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand dunes.	Unlikely to occur. No suitable habitat occurs on-site.
Callocephalon fimbriatum	Gang-gang Cockatoo	Bird	Vulnerable NSW BC Act	Tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In winter, may occur at lower altitudes in drier more open eucalypt forests and woodlands, and often found in urban areas. preferring more open eucalypt forests and woodlands, particularly in box-ironbark assemblages, or in dry forest in coastal areas. Favours old growth attributes for nesting and roosting	Possibly occurring. Suitable foraging habitat is present. Further assessment has been undertaken in s3.2.2.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Calidris tenuirostris	Great Knot	Bird	NSW BC Act: Vulnerable EPBC Act: Migratory	In Australasia, the species typically prefers sheltered coastal habitats, with large intertidal mudflats or sandflats. This includes inlets, bays, harbours, estuaries and lagoons. They are occasionally found on exposed reefs or rock platforms, shorelines with mangrove vegetation, ponds in saltworks, at swamps near the coast, saltlakes and non-tidal lagoons. The Great Knot rarely occurs on inland lakes and swamps. Typically, the Great Knot roosts in large groups in open areas, often at the waters edge or in shallow water close to feeding grounds. It is known that in hot conditions, waders prefer to roost where a damp substrate lowers the local temperature.	Unlikely to occur. No suitable habitat occurs on-site.
Gallinago hardwickii	Latham's Snipe	Bird	EPBC Act: Migratory	In Australia, Latham's Snipe occurs in permanent and ephemeral wetlands up to 2000 m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies). However, they can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity.	Unlikely to occur. No suitable habitat occurs on-site.
Charadrius mongolus	Lesser Sand-plover	Bird	EPBC Act: Migratory NSW BC Act: Vulnerable	In non-breeding grounds in Australia, this species usually occurs in coastal littoral and estuarine environments. It inhabits large intertidal sandflats or mudflats in sheltered bays, harbours and estuaries, and occasionally sandy ocean beaches, coral reefs, wave-cut rock platforms and rocky outcrops. It also sometime occurs in short saltmarsh or among mangroves.	Unlikely to occur. No suitable habitat occurs on-site.
Hieraaetus morphnoides	Little Eagle	Bird	Vulnerable NSW BC Act	Occupies open eucalypt forest, woodland or open woodland. She-oak or acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter	Possibly occurring. Suitable nesting habitat occurs within the subject site. Further assessment has been undertaken in s3.2.2.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Glossopsitta pusilla	Little Lorikeet	Bird	Vulnerable NSW BC ACT	Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species. Roosts in treetops, often distant from feeding areas. Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts. Entrance is small (3 cm) and usually high above the ground (2–15 m). These nest sites are often used repeatedly for decades, suggesting that preferred sites are limited. Riparian trees often chosen, including species like Allocasuarina	Possibly occurring. Suitable foraging habitat occurs within the subject site. Further assessment has been undertaken in s3.2.2.
Sternula albifrons	Little Tern	Bird	Endangered NSW BC Act Migratory EPBC Act	Mostly exclusively coastal, preferring sheltered environments; however may occur several kilometres from the sea in harbours, inlets and rivers (with occasional offshore islands or coral cay records). Nests in small, scattered colonies in low dunes or on sandy beaches just above the high tide mark near estuary mouths or adjacent to coastal lakes and islands. Nests in a scrape in the sand, which may be lined with shell grit, seaweed or small pebbles.	Unlikely to occur. No suitable habitat occurs on-site.
Tyto novaehollandiae	Masked Owl	Bird	Vulnerable NSW BC Act	Dry eucalypt forests and woodlands from sea level to 1100 m. Inhabits forest but often hunts along the edges of forests, including roadsides. The typical diet consists of tree-dwelling and ground mammals, especially rats. Pairs have a large home-range of 500 to 1000 hectares. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting. Requires old growth elements-hollow bearing tree resources for nesting and prey source.	Possibly occurring. Suitable foraging habitat occurs within the subject site. Further assessment has been undertaken in s3.2.2.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Pachycephala olivacea	Olive Whistler	Bird	Vulnerable NSW BC Act	The Olive Whistler inhabits the wet forests on the ranges of the east coast. It has a disjunct distribution in NSW chiefly occupying the beech forests around Barrington Tops and the MacPherson Ranges in the north and wet forests from Illawarra south to Victoria. In the south it is found inland to the Snowy Mountains and the Brindabella Range. Mostly inhabit wet forests above about 500m. During the winter months they may move to lower altitudes. Forage in trees and shrubs and on the ground, feeding on berries and insects. Make nests of twigs and grass in low forks of shrubs. Lay two or three eggs between September and January.	Unlikely to occur. No suitable habitat occurs on-site.
Pluvialis fulva	Pacific Golden Plover	Bird	Migratory EPBC Act	This species usually forages on sandy or muddy shores (including mudflats and sandflats) or margins of sheltered areas such as estuaries and lagoons, though it also feeds on rocky shores, islands or reefs. In addition, Pacific Golden Plovers occasionally forage among vegetation, such as saltmarsh, mangroves or in pasture or crops. They usually roost near foraging areas, on sandy beaches and spits or rocky points, islets or exposed reefs, occasionally among or beneath vegetation including mangroves or low saltmarsh, or among beachcast seaweed. They sometimes also roost on levee banks and islands in evaporation ponds in saltworks. Breeding occurs in dry areas of tundra away from the coast, including upland and montane tundra, usually on slopes of low hills, knolls or foothills vegetated with lichen and moss, or in bare, stony areas. Some sites are near vegetated areas with shrubs, and although usually above the treeline, they very occasionally breed in forest tundra. After the young hatch, they move to moister habitats, such as Sphagnum swamps.	Unlikely to occur. No suitable habitat occurs on-site.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Haematopus longirostris	Pied Oystercatcher	Bird	Endangered NSW BC Act	Favours intertidal flats of inlets and bays, open beaches and sandbanks. Forages on exposed sand, mud and rock at low tide, for molluscs, worms, crabs and small fish. Nests mostly on coastal or estuarine beaches although occasionally they use saltmarsh or grassy areas. Nests are shallow scrapes in sand above the high tide mark, often amongst seaweed, shells and small stones.	Unlikely to occur. No suitable habitat occurs on-site.
Petroica rodinogaster	Pink Robin	Bird	Vulnerable NSW BC Act	Inhabits rainforest and tall, open eucalypt forest particularly in densely vegetated gullies	Possibly occurring. Suitable habitat occurs within the subject site. Further assessment has been undertaken in s3.2.2.
Ninox strenua	Powerful Owl	Bird	Vulnerable NSW BC Act	Coastal Woodland, Dry Sclerophyll Forest, wet sclerophyll forest and rainforest- Can occur in fragmented landscapes Roosts in dense vegetation comprising species such as Turpentine Syncarpia glomulifera, Black She-oak Allocasuarina littoralis, Blackwood Acacia melanoxylon, Rough-barked Apple Angophora floribunda, Cherry Ballart Exocarpus cupressiformis and a number of eucalypt species. requires old growth elements-hollow bearing tree resources for nesting and prey resource. Nests in large tree hollows in large eucalypts that are at least 150yrs old. Often in riparian areas. Large home range	Possibly occurring. Suitable foraging habitat occurs within the subject site. Further assessment has been undertaken in s3.2.2.
Calidris ruficollis	Red-necked Stint	Bird	Migratory EPBC Act	The Red-necked Stint mostly forages on bare wet mud on intertidal mudflats or sandflats, or in very shallow water; mostly in areas with a film of surface water and mostly close to edge of water. During high tides they sometimes forage in non-tidal wetlands. Red-necked Stints may also forage in samphire, generally avoid beds of seagrass, but may feed along edges. On Lake Reeve, Victoria, they have been reported to occasionally feed on algal mats. On sandy ocean beaches they sometimes forage in beachcast seaweed. They have been recorded foraging in flooded paddocks and in a freshly cropped lucerne	Unlikely to occur. No suitable habitat occurs on-site.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
				paddock near lagoons. Roosts on sheltered beaches, spits, banks or islets, of sand, mud, coral or shingle, sometimes in saltmarsh or other vegetation. They occasionally roost on exposed reefs or shoals. Large numbers sometimes roost on ocean beaches, though it is probably not a preferred habitat and use of this habitat may increase when high numbers of birds are present. They were once recorded roosting c. 1.5 km from an inland lake, in close-cropped grass. They also roost among beachcast seaweed or clods of mud or dried cow-pats. During very high tides they may use sand dunes or claypans. Large numbers (an estimated 7967 birds) were recorded roosting at an inland claypan near Roebuck Bay in north-west Western Australia.	
Anthochaera phrygia	Regent Honeyeater	Bird	Critically endangered EPBC Act Critically endangered NSW BC Act	Temperate woodlands and open forests- and drier coastal woodlands in some years (flowering coastal woodlands and forests including box-ironbark woodland, and riparian forests-that exhibit large numbers of mature trees, high canopy cover and abundance of mistletoes) Key eucalypt species include Mugga Ironbark, Yellow Box, Blakely's Red Gum, White Box and Swamp Mahogany. Also utilises: Eucalyptus microcarpa, E. punctata, E. polyanthemos, E. moluccana, Corymbia robusta, E. crebra, E. caleyi, C. maculata, E.mckieana, E. macrorhyncha, E. laevopinea, and Angophora floribunda. Nectar and fruit from the mistletoes Amyema miquelii, A. pendula and A. cambagei are also eaten during the breeding season.	Possibly occurring. Suitable foraging habitat occurs within the subject site. Further assessment has been undertaken in s3.2.2.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Calidris alba	Sanderling	Bird	Vulnerable NSW BC Act	Often found in coastal areas on low beaches of firm sand, near reefs and inlets, along tidal mudflats and bare open coastal lagoons; individuals are rarely recorded in near-coastal wetlands. Generally occurs in small flocks, however may associate freely with other waders. Individuals run behind receding waves, darting after insects, larvae and other small invertebrates in the sand, then dart back up the beach as each wave breaks. Also feeds on plants, seeds, worms, crustaceans, spiders, jellyfish and fish, foraging around rotting heaps of kelp, at the edges of shallow pools on sandspits and on nearby mudflats. Roosts on bare sand, behind clumps of beach-cast kelp or in coastal dunes. Breeding occurs in the Northern Hemisphere.	Unlikely to occur. No suitable habitat occurs on-site.
Petroica boodang	Scarlet Robin	Bird	Vulnerable NSW BC Act	The Scarlet Robin is primarily a resident in dry forests and woodlands, but some adults and young birds disperse to more open habitats after breeding.	Possibly occurring. Suitable foraging habitat occurs within the subject site. Further assessment has been undertaken in s3.2.2.
Ardenna tenuirostris	Short-tailed Shearwater	Bird	Migratory EPBC Act	Coastal, oceanic.	Unlikely to occur. No suitable habitat occurs on-site.
Circus assimilis	Spotted Harrier	Bird	Vulnerable NSW BC Act	The Spotted Harrier occurs throughout the Australian mainland, except in densely forested or wooded habitats or the coast, escarpment and ranges, and rarely in Tasmania. Individuals disperse widely in NSW and comprise a single population.	Unlikely to occur. No suitable habitat occurs on-site.
Lophoictinia isura	Square-Tailed Kite	Bird	Vulnerable NSW BC Act	Summer breeding migrant to the south-east, including the NSW south coast, arriving in September and leaving by March. Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses large hunting ranges of more than 100km2. Breeding is from July to February, with nest sites generally located along or near watercourses, in a fork or on large horizontal limbs.	Possibly occurring. Suitable habitat occurs within the subject site. Further assessment has been undertaken in s3.2.2.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Lathamus discolor	Swift Parrot	Bird	Endangered EPBC Act Endangered NSW BC Act	Migrates to the Australian south-east mainland between March and October. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany (Eucalyptus robusta), Spotted Gum (Corymbia maculata), Red Bloodwood (C. gummifera), Mugga Ironbark (E. sideroxylon), and White Box (E. albens). Commonly used lerp infested trees include Inland Grey Box E. microcarpa, Grey Box E. moluccana and Blackbutt E. pilularis. Return to some foraging sites on a cyclic basis depending on food availability. Following winter they return to Tasmania where they breed from September to January, nesting in old trees with hollows and feeding in forests dominated by Tasmanian Blue Gum Eucalyptus globulus.	Possibly occurring. Suitable foraging habitat occurs within the subject site. Further assessment has been undertaken in s3.2.2.
Daphoenositta chrysoptera	Varied Sittella	Bird	Vulnerable NSW BC Act	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland	Possibly occurring. Suitable foraging habitat occurs within the subject site. Further assessment has been undertaken in s3.2.2.
Ardenna pacifica	Wedge-tailed Shearwater	Bird	Migratory EPBC Act	A pelagic, marine bird known from tropical and subtropical waters. The species tolerates a range of surface-temperatures and salinities, but is most abundant where temperatures are greater than 21 °C and salinity is greater than 34.6 %. In tropical zones the species may feed over cool nutrient-rich waters. The species has been recorded in offshore waters of eastern Victoria and southern NSW, mostly over continental slope with sea-surface temperatures of 13.9–24.4 °C and usually off the continental shelf in north-west Australia.	Unlikely to occur. No suitable habitat occurs on-site.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Haliaeetus leucogaster	White-bellied Sea-Eagle	Bird	NSW BC Act Vulnerable Migratory EPBC Act	Found in coastal habitats (especially those close to the sea-shore) and around terrestrial wetlands in tropical and temperate regions of mainland Australia and its offshore islands. The habitats occupied by the sea-eagle are characterized by the presence of large areas of open water (larger rivers, swamps, lakes, the sea). Birds have been recorded in (or flying over) a variety of terrestrial habitats.	Unlikely to occur. No suitable habitat occurs on-site.
Epthianura albifrons	White-fronted Chat	Bird	Vulnerable NSW BC Act	Commonly occurring in the saltmarshes of southern Australia, the White-fronted Chat is often seen foraging for insects and their larvae among the succulent leaves and stems of stunted saltmarsh plants.	Unlikely to occur. No suitable habitat occurs on-site.
Hirundapus caudacutus	White-throated Needletail	Bird	Migratory EPBC Act	Almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Because they are aerial, it has been stated that conventional habitat descriptions are inapplicable, but there are, nevertheless, certain preferences exhibited by the species. Although they occur over most types of habitat, they are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland. They also commonly occur over heathland, but less often over treeless areas, such as grassland or swamps. When flying above farmland, they are more often recorded above partly cleared pasture, plantations or remnant vegetation at the edge of paddocks. In coastal areas, they are sometimes seen flying over sandy beaches or mudflats, and often around coastal cliffs and other areas with prominent updraughts, such as ridges and sand-dunes. They are sometimes recorded above islands well out to sea.	Possibly occurring transiently over or in proximity to the site, but unlikely to utilise habitat within the site.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Pteropus poliocephalus	Grey-headed Flying-fox	Mammal	Vulnerable EPBC Act Vulnerable NSW BC Act	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.	Possibly occurring. Suitable foraging habitat occurs within the subject site. Further assessment has been undertaken in s3.2.2.
Phascolarctos cinereus	Koala	Mammal	Vulnerable NSW BC Act	Eucalypt woodland and forest Home range sizes vary with quality of habitat ranging from less than 2 ha to several hundred ha. Preferred tree species on the south coast are Eucalyptus amplifolia, E.viminalis, & E.tereticornis but numerous other species also known food trees.	Unlikely to occur. No suitable habitat occurs on-site.
Potorous tridactylus	Long-nosed Potoroo	Mammal	Vulnerable EPBC Act Vulnerable NSW BC Act	Inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature. The fruit-bodies of hypogeous (underground-fruiting) fungi are a large component of the diet of the Long-nosed Potoroo. They also eat roots, tubers, insects and their larvae and other soft-bodied animals in the soil. Often digs small holes in the ground in a similar way to bandicoots. Mainly nocturnal, hiding by day in dense vegetation - however, during the winter months animals may forage during daylight hours. Individuals are mainly solitary, non-territorial and have home range sizes ranging between 2-5 ha.	Unlikely to occur. No suitable habitat occurs on-site. Not detected during camera-trap surveys.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Petauroides volans	Southern Greater Glider	Mammal	Vulnerable EPBC Act	Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe. Shelter during the day in tree hollows and will use up to 18 hollows in their home range. Occupy a relatively small home range with an average size of 1 to 3 ha. Give birth to a single young in late autumn or early winter which remains in the pouch for approximately 4 months and is independent at 9 months of age. Usually solitary, though mated pairs and offspring will share a den during the breeding season and until the young are independent. Can glide up to a horizontal distance of 100m including changes of direction of as much as 90 degrees. Very loyal to their territory.	Unlikely to occur. No suitable hollow-bearing trees occur within or in proximity to the site. No known populations or records of the species occur in proximity to the site. No connectivity occurs to support movement to site for nearest known population at Sven Mile Beach.
Dasyurus maculatus	Spotted-tailed Quoll	Mammal	Endangered EPBC Act Vulnerable NSW BC Act	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. Mostly nocturnal, although will hunt during the day; spends most of the time on the ground, although also an excellent climber and will hunt possums and gliders in tree hollows and prey on roosting birds. Use communal 'latrine sites', often on flat rocks among boulder fields, rocky cliff-faces or along rocky stream beds or banks. Such sites may be visited by multiple individuals and can be recognised by the accumulation of the sometimes characteristic 'twisty-shaped' faeces deposited by animals. Females occupy home ranges up to about 750 hectares and males up to 3500 hectares. Are known to traverse their home ranges along densely vegetated creeklines.	Unlikely to occur. No suitable habitat occurs on-site.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Petaurus norfolcensis	Squirrel Glider	Mammal	NSW BC Act Vulnerable	Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia midstorey. Live in family groups of a single adult male one or more adult females and offspring. Require abundant tree hollows for refuge and nest sites. Diet varies seasonally and consists of Acacia gum, eucalypt sap, nectar, honeydew and manna, with invertebrates and pollen providing protein.	Unlikely to occur. No suitable hollow-bearing trees occur within or in proximity to the site.
Petaurus australis	Yellow-bellied Glider	Mammal	Vulnerable NSW BC Act	Forest with old growth elements. Large Eucalypt Hollows for denning- Inhabits mature or old growth Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia mid storey. Feed primarily on plant and insect exudates, including nectar, sap, honeydew and manna with pollen and insects providing protein. Extract sap by incising (or biting into) the trunks and branches of favoured food trees, often leaving a distinctive 'V'-shaped scar. Very mobile and occupy large home ranges between 20 to 85 ha to encompass dispersed and seasonally variable food resources.	Unlikely to occur. No suitable hollow-bearing trees occur within or in proximity to the site. No known populations or records of the species occur in proximity to the site.
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	Microchiropteran bat	Vulnerable NSW BC Act, Vulnerable EPBC Act	Small tree hollows/fissures in bark for roosting in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range.	Possibly occurring. Suitable foraging habitat occurs within the subject site. Further assessment has been undertaken in s3.2.2.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Falsistrellus tasmaniensis	Eastern False Pipistrelle	Microchiropteran bat	NSW BC Act Vulnerable	Prefers moist habitat that contains trees greater than 20 m high with a dense undertstorey. They are fast flyers. Roosts in hollow trunks of eucalyptus trees, in colonies of 3 – 80. Also may roost in caves and old wooden buildings. This species changes roost every night. Roosts on consecutive nights are usually less than 750 m apart. This species has a home range of up to 136 ha (Churchill, S 2008, Australian Bats, Jacana Books, Crows Nest, NSW). Although they prefer habitat with a dense understorey, they prefer to forage along flyways to avoid the thick understorey. They prefer continuous forest and avoid remnant vegetation. However, they have been recorded in open forests (Churchill, S 2008, Australian Bats, Jacana Books, Crows Nest, NSW).	Possibly occurring. Suitable foraging habitat occurs within the subject site. Further assessment has been undertaken in s3.2.2.
Scoteanax rueppellii	Greater Broad-nosed Bat	Microchiropteran bat	Vulnerable NSW BC Act	Found mainly in gullies and river systems that drain the Great Dividing Range, it utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, below 500m, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings. Forages after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 - 6 m	Possibly occurring. Suitable foraging habitat occurs within the subject site. Further assessment has been undertaken in s3.2.2.
Miniopterus orianae oceanensis	Large Bent-winged Bat	Microchiropteran bat	NSW BC Act Vulnerable	Specific caves are known maternity sites with other caves being primary roosting habitat outside breeding period. Also uses derelict mines, storm-water tunnels, buildings and other man-made structures. Hunts in forested areas, catching moths and other flying insects above the tree tops.	Possibly occurring. Suitable foraging habitat occurs within the subject site. Further assessment has been undertaken in s3.2.2.

Species name	Common name	Type	Status	Species information & habitat requirements	Likelihood of presence within areas impacted by the activity
Myotis macropus	Southern Myotis	Microchiropteran bat	Vulnerable NSW BC Act	This species is predominantly roosts in caves, however, is known to roost in trees and man- made structures close to water. Roosts are generally located close to water, where the bats forage in small groups of three or four. They have a strong association with streams and permanent waterways in areas that are vegetated rather than cleared (Churchill, S 2008, Australian Bats, Jacana Books, Crows Nest, NSW They feed on small fish, prawns and aquatic macroinvertebrates. They have a preference towards large still pools, rather than flowing streams. They will also forage an aerial insects flying over water. They use their large feet to capture prey items (Churchill 2008).	Possibly occurring. Suitable foraging habitat occurs within the subject site. Further assessment has been undertaken in s3.2.2.
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Microchiropteran bat	Vulnerable NSW BC Act	Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory. Breeding has been recorded from December to mid-March, when a single young is born. Seasonal movements are unknown; there is speculation about a migration to southern Australia in late summer and autumn	Possibly occurring. Suitable foraging habitat occurs within the subject site. Further assessment has been undertaken in s3.2.2.